



FILED

07/28/21
04:59 PM

A2107014

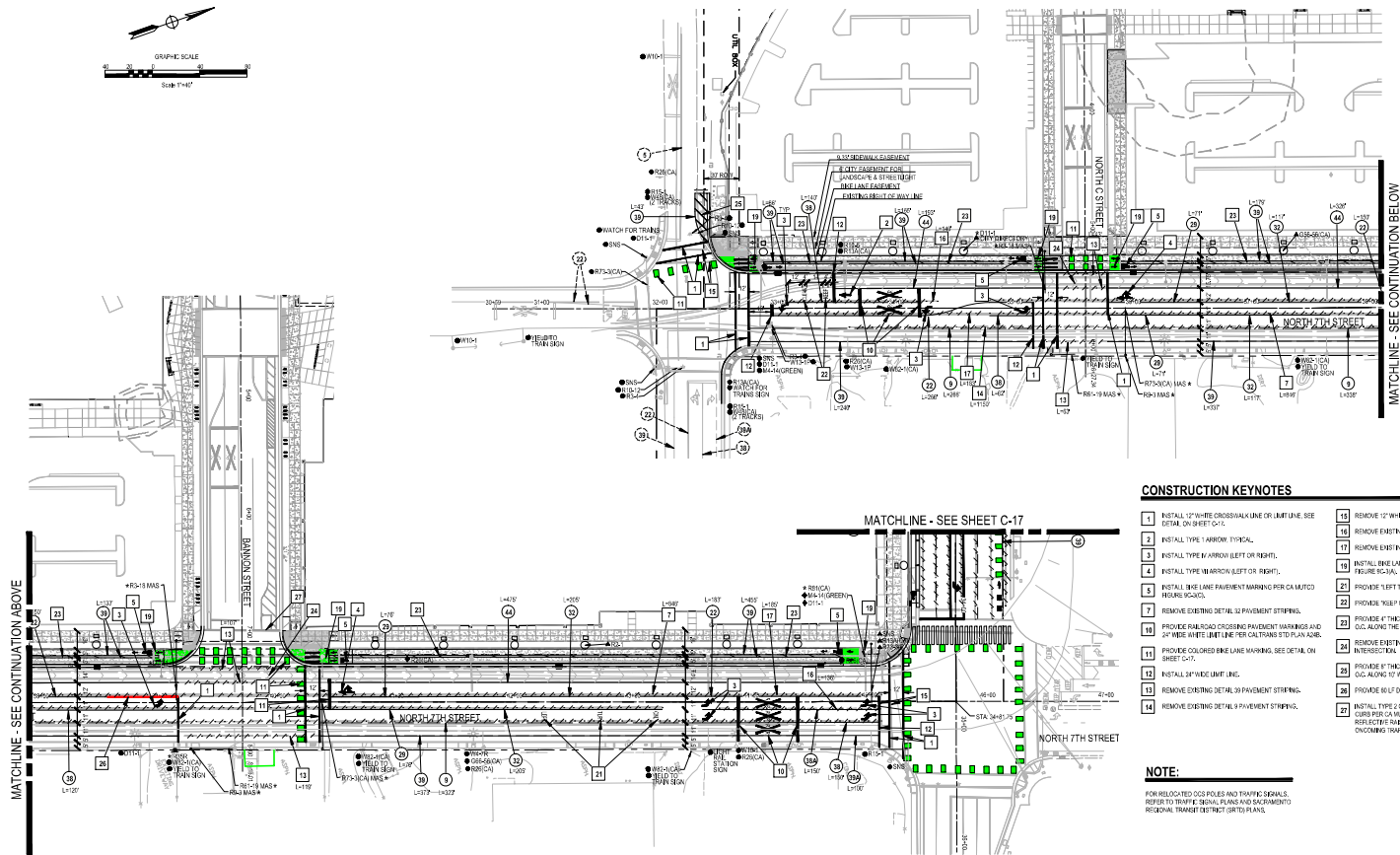
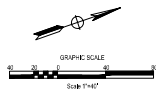
Attachment A

Vicinity Map

NO SCALE

Attachment B

Proposed At-Grade Crossing Signing and Striping Plans



CONSTRUCTION KEYNOTES

- | | |
|--|--|
| 1. INSTALL 12" WHITE CROSSWALK LINE OR LANE LINE, SEE DETAIL ON SHEET C-15. | 15. REMOVE 12" WHITE CROSSWALK LINE. |
| 2. INSTALL TYPE 1 ARROW, TYPICAL. | 16. REMOVE EXISTING 30' PAVEMENT STRIPING. |
| 3. INSTALL TYPE 1 ARROW, LEFT OR RIGHT. | 17. REMOVE EXISTING 30' PAVEMENT STRIPING. |
| 4. INSTALL TYPE 18 ARROW, LEFT OR RIGHT. | 18. REMOVE EXISTING 30' PAVEMENT STRIPING. |
| 5. INSTALL TYPE 18 ARROW, LEFT OR RIGHT. | 19. REMOVE EXISTING 30' PAVEMENT STRIPING. |
| 6. REMOVE EXISTING DETAIL 10' PAVEMENT STRIPING. | 20. REMOVE EXISTING 30' PAVEMENT STRIPING. |
| 7. PROVIDE 24" WIDE CROSSING PAVEMENT MARKINGS AND 24" WIDE WHITE LANE LINE PER CALTRANS STD. PLAN A-10. | 21. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 8. PROVIDE COLORED BAY LINE MARKING, SEE DETAIL ON SHEET C-15. | 22. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 9. INSTALL 30" WIDE LANE LINE. | 23. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 10. REMOVE EXISTING DETAIL 10' PAVEMENT STRIPING. | 24. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 11. REMOVE EXISTING DETAIL 10' PAVEMENT STRIPING. | 25. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 12. REMOVE EXISTING DETAIL 10' PAVEMENT STRIPING. | 26. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 13. REMOVE EXISTING DETAIL 10' PAVEMENT STRIPING. | 27. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |
| 14. REMOVE EXISTING DETAIL 10' PAVEMENT STRIPING. | 28. PROVIDE 12" TURN ONLY PAVEMENT MARKINGS. |

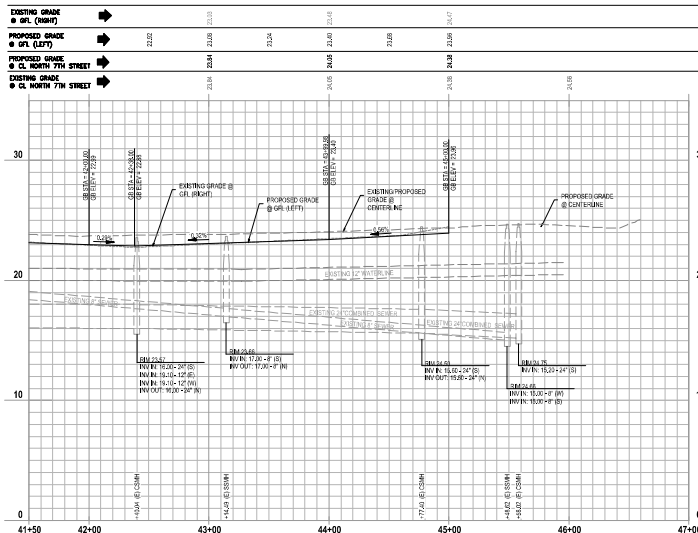
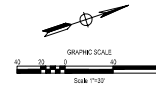
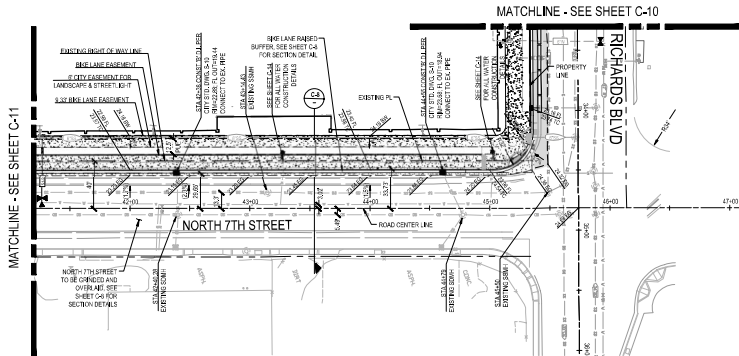
NOTE:

FOR RELOCATED STOP POLES AND TRAFFIC SIGNALS, REFER TO TRAFFIC SIGNAL PLANS AND SACRAMENTO REGIONAL TRAFFIC DISTRICT (RTD) PLANS.

REVISIONS		BENCH MARK	FIELD BOOK	CITY OF SACRAMENTO		RICHARDS BLVD. OFFICE COMPLEX				SHEET C-18 OF 58
DESCRIPTION		DESCRIPTION	DESCRIPTION	DEPARTMENT OF PUBLIC WORKS		SIGNAGE & STRIPING NORTH 7TH STREET				
DATE	BY	ELEV. 23.048 (HAYDEN)	SCALE	DRAWN BY: [Signature]		DESIGNED BY: [Signature]				
				DATE: [Date]		DATE: [Date]		CITY OF SACRAMENTO, CALIFORNIA		

Attachment C

Proposed At-Grade Crossing Grade Lines



NOTE: CONTRACTOR TO FILL OUT AFTER PROJECT COMPLETION.

CONSTRUCTION INFORMATION	
CONTRACTOR _____	INSTALL DATE: _____
SEWER MAIN MATERIAL: _____	PERE MFC: _____
SEWER LATERAL MATERIAL: _____	PERE MFC: _____
SEWER INLET LEAD MATERIAL: _____	PERE MFC: _____
<input type="checkbox"/> SEWER LATERAL LOCATIONS SUBMITTED	
INFORMATION APPROVED BY (CONTR.): _____	
INFORMATION ACQUIRED BY (CITY): _____	

NO.	REVISIONS	DATE	BY
1	DESCRIPTION		
2			
3			
4			

BENCH MARK
DESCRIPTION: CITY PLAT 28-2-10
ELEV. 23.048 (HAYWARD)
BENCHMARK IN TRAFFIC SIGNAL BASE, SE CORNER
OF RICHARDS BLVD. & SEQUOIA PARK BLVD.

FIELD BOOK
SCALE: N/A
DRAWN BY: _____
DATE: _____

CITY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS
DESIGN BY: _____
DATE: _____
CHECKED BY: _____
DATE: _____

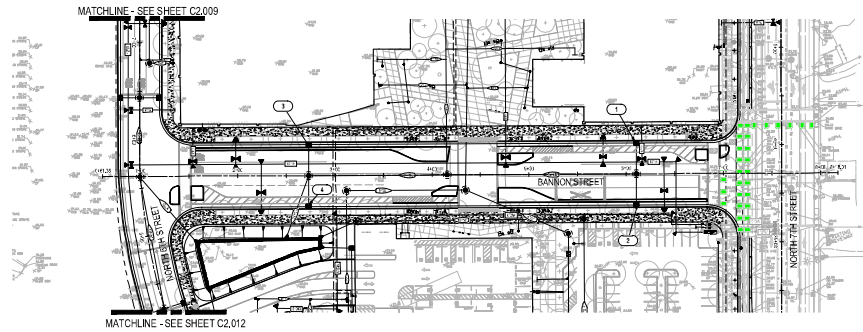
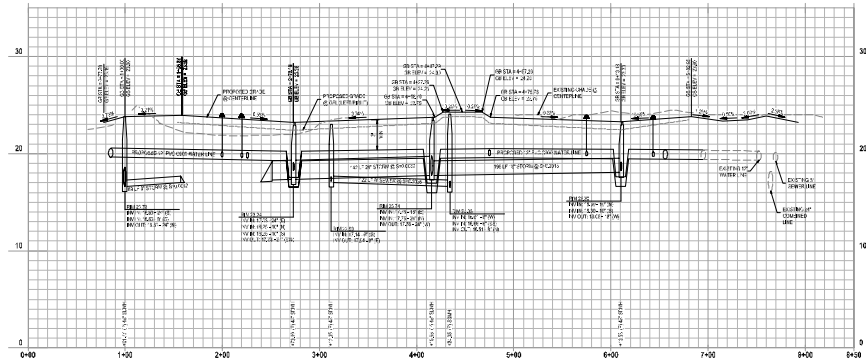
RICHARDS BLVD. OFFICE COMPLEX
PLAN & PROFILE NORTH 7TH STREET
STA 42+00 TO 47+00
CITY OF SACRAMENTO, CALIFORNIA



CRC 21-0002
P 15611700
PL 2021019
SHEET
C-12
OF
58

This drawing is the property of the City of Sacramento and is not to be reproduced or used in any way without the written consent of the City of Sacramento. The City of Sacramento is not responsible for any errors or omissions in this drawing.

1	STA 0+14.05 CONSTRUCT THE SPILL FLYWAY - 32.00' WIDE OUT - 15.00' CONNECT TO FORDGROVE STORM DRAIN/CHANNEL AT THE S/E OF DRIVE INLET AT 0+00.0
2	STA 0+14.05 CONSTRUCT THE SPILL FLYWAY - 32.00' WIDE OUT - 15.00' CONNECT TO FORDGROVE STORM DRAIN/CHANNEL AT THE S/E OF DRIVE INLET AT 0+00.0
3	STA 0+14.05 CONSTRUCT THE SPILL FLYWAY - 32.00' WIDE OUT - 15.00' CONNECT TO FORDGROVE STORM DRAIN/CHANNEL AT THE S/E OF DRIVE INLET AT 0+00.0
4	STA 0+14.05 CONSTRUCT THE SPILL FLYWAY - 32.00' WIDE OUT - 15.00' CONNECT TO FORDGROVE STORM DRAIN/CHANNEL AT THE S/E OF DRIVE INLET AT 0+00.0

[illegible]

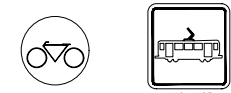
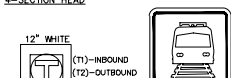
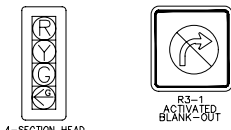
Attachment D

Proposed Intersection Signal Plans

POLE AND EQUIPMENT SCHEDULE																	
LOCATION	STANDARD	VEH. SIGNALS			PED. SIGNALS			P.P.B.	WAST ARM LENGTH	LUM. WATT.	NOTES						
		TYPE	SEC	MTG.	TYPE	MTG.	#					ARROW	TRA SIG.	ST.LT.			
(A)	28-4-100	4	1WOL	12"	SV-1-T	4	1WOL	SP-1-T	2	LEFT	(FUTURE)	12'	110W LED	CAP SMA MOUNTING PLATE.	[12]	[18]	
(B)	1-8	3	1WOL	12"	SV-3-T	2	1WOL	SP-1-T	2	LEFT				INSTALL T SIGNAL ON POLE.	[12]		
(C)	(MODIFIED) 28-4-100	3	1WOL	12"	MAT SV-2-T	4	1WOL	SP-1-T	2	LEFT		40'	12'	110W LED	INSTALL O3 SIGN "Bannon St." AND R73-1(CA) SIGN. INSTALL T SIGNAL ON POLE.	[3]	[13] [15]
(D)	1-8(*)	3	1WOL	12"	SV-2-T	2	1WOL	TP-1-T	2	LEFT							
(E)	23-4-100	6	1WOL	12"	MAS-4B SV-2-T	4	1WOL	SP-1-T	2	LEFT		35'			INSTALL O3 SIGN "N 7th St" AND R61-19 SIGN. INSTALL T SIGNAL ON POLE.	[14]	[16] [17]
(F)	(MODIFIED) 28-5-100	4	1WOL	12"	MAT TV-2-T-1B	4	1WOL	SP-1-T	2	LEFT		50'	15'	110W LED	INSTALL O3 SIGN "Bannon St" AND R3-18(CA) SIGN. INSTALL R9-3 SIGN ON POLE. INSTALL T SIGNAL ON POLE.	[3]	[6] [10] [12] [13] [14] [15]
(G)	1-8	6	1WOL	12"	TV-1-T					RIGHT						[14]	

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE EOL eLife Star SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 1020 (TYPE 3 DISTRIBUTION).

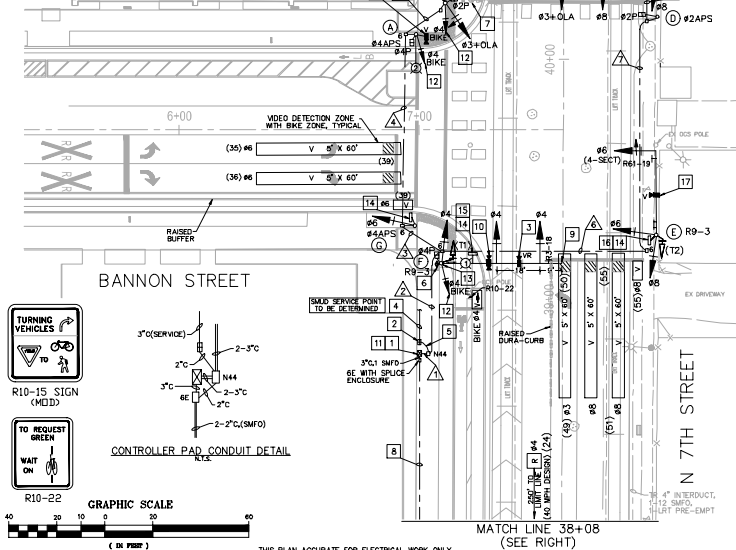
REFER TO SHEET TS-11 FOR CONDUCTOR SCHEDULE



LUMINAIRE SCHEDULE:
NEW METERED SERVICE NO. IS LOCATED AT THE SOUTHWEST CORNER OF N 7TH ST / BANNON ST.

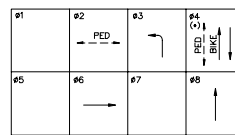
CIRCUIT NUMBER	NEW 110W LED WAST ARM
1	2
2	1
TOTAL	3

- CONNECT LUMINAIRES TO 120V CIRCUITS.
- NEW SERVICE IS 120/240V, 1Ø, 3 WIRE.
- SMUD S/A #

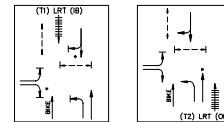


CONSTRUCTION NOTES (THIS SHEET ONLY)

- FURNISH AND INSTALL, TYPE 34X4 CABINET AND FOUNDATION, ATC/EX TS2 TYPE 2 2070 CONTROLLER, DA SOFTWARE, CSDO E-2000-ETC-0-0-0, TRIPPLITE USBAR 6 SURGE PROTECTOR AND ALL ASSOCIATED EQUIPMENT. DOOR SHALL OPEN TO THE EAST. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.
- FURNISH AND INSTALL A METERED SERVICE PEDESTAL FOR TRAFFIC SIGNAL PER CITY STANDARDS AND CITY STANDARD DRAWING. FRONT DOOR SHALL OPEN TO THE SIDEWALK.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA ON SIGNAL MAST ARM, VECTOR VIDEO/RADAR HYBRID UNIT AS MANUFACTURED BY ITERRIS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.
- INSTALL 3"Ø, 3/4" ID FROM SERVICE CABINET TO SERVICE POINT. CONTACT SMUD FOR SERVICE HOOK-UP. CONTRACTOR SHALL INCLUDE AS PART OF HIS WORK ALL COSTS ASSOCIATED WITH SERVICE INSTALLATION.
- INSTALL 2"Ø, 3/8" THW (CONTROLLER), 3/8" THW (LIGHTING), 1/4" THW, 3/4" THW (PHOTO CELLS).
- FURNISH AND INSTALL GPS PROPRIETARY CONTROL UNIT ON POLE. REFER TO DETAIL SHEET TS-8. GPS SHALL BE PROGRAMMED PER CITY STANDARDS.
- REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- INSTALL 2-2"Ø, 1-12 STRAND SAFD, 2 LRT PRE-EMPT COMMUNICATION CABLES.
- PROVIDE AND CAP TENSION FOR FUTURE USE.
- FURNISH AND INSTALL, PTZ CCTV CAMERA (AXIS Q1155-E) WITH MAST ARM PARAPET MOUNT. INSTALL BELDON CAT6 CABLE 1927A TO CONTROLLER CABINET.
- TERMINATE FIBER CABLE IN CONTROLLER CABINET.
- FURNISH AND INSTALL SIGNAL HEAD WITH BICYCLE INDICATIONS PER STATE STANDARD PLAN ES-4C.
- FURNISH AND INSTALL MODIFIED POLE WITH SIGNAL MAST ARM MOUNTED HIGHER ON POLE TO PROVIDE CLEARANCE ABOVE OVERHEAD LRT CONTACT SYSTEM LINES. SEE DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.
- FURNISH AND INSTALL R3-1 ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL W10-7 ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL W10-MOD ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA ON SIGNAL MAST ARM, VANTAGE R24 COLOR CAMERA WITH EDGE2 PROCESSOR AND SMARTCYCLE TECHNOLOGY AS MANUFACTURED BY ITERRIS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.

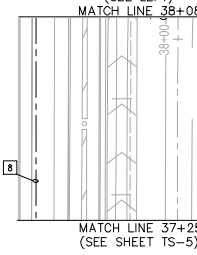


OLA = 02 + 03
(*) = 06 R3-1 ACTIVATED SIGN ON
PROPOSED PHASE DIAGRAM



PROPOSED LRT PROPRIETARY PRE-EMPTION
(11) = LRT 08 TRAIN SIGNAL
(12) = LRT 09 TRAIN SIGNAL
(13) = LRT INBOUND TO DOWNTOWN
(14) = LRT OUTBOUND FROM DOWNTOWN
* = ACTIVATED SIGNS ON

(SEE LEFT) MATCH LINE 38+08



EVP ASSIGNMENTS

CABINET	CARD	PHASE
EVS	CH A	06
EVS	CH B	04
EVS	CH C	04



ACCEPTED BY: _____ DATE: _____
KALER HALE, E-15137
SENIOR ELECTRICAL ENGINEER

REVISIONS			BENCH MARK		FIELD BOOK		SCALE		DRAWN BY: M. BUCKNER		DESIGN BY: M. BUCKNER		CHECKED BY: J. ANDERSON		OFF-SITE IMPROVEMENT PLANS FOR		SHEET	
NO.	DESCRIPTION	DATE	DATE	DESCRIPTION	ELEV. (FAD 88.00000)	FILE	HORIZ. 1"=20'	VERT. 1"=20'	FILE	R.C.E.	DATE	R.C.E.	DATE	DATE	DATE	DATE	TS-4	OF

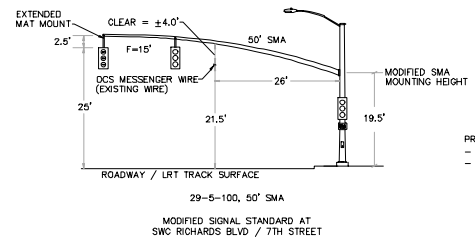
CITY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS

RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL PLAN
N 7th STREET / BANNON STREET
CITY OF SACRAMENTO, CA

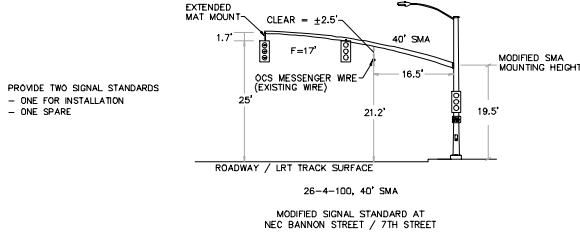
Anderson
Transportation Engineers
3853 Taylor Road, Suite G
Lodi, California 95650
JUNE 18, 2021 - SECOND SUBMITTAL

NOTES:

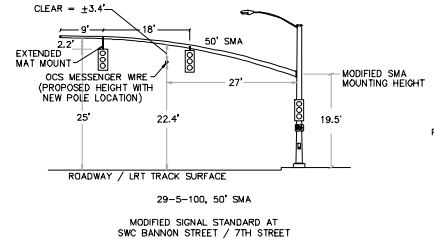
1. MODIFIED POLE DIAMETER AND WALL THICKNESS TO BE AS DETERMINED BY POLE MANUFACTURER.
2. REFER TO CALTRANS 2018 STANDARD PLANS ES-7F AND ES-7G FOR STANDARD POLE DETAILS. STANDARD SIGNAL MAST ARM MOUNTING HEIGHT ON POLE IS 16 FEET.
3. PER CA MUTCD SECTION 4D.15, THE TOP OF THE SIGNAL HOUSING OF A VEHICULAR SIGNAL FACE LOCATED OVER ANY PORTION OF A HIGHWAY THAT CAN BE USED BY MOTOR VEHICLES SHALL NOT BE MORE THAN 25.6 FEET ABOVE THE PAVEMENT.
4. SPARE POLES TO BE DELIVERED TO CITY OF SACRAMENTO SIGNAL MAINTENANCE YARD.



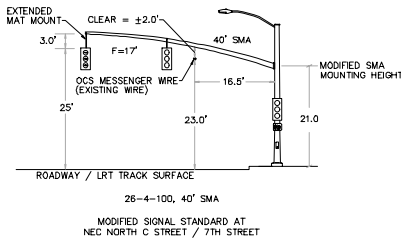
PROVIDE TWO SIGNAL STANDARDS
- ONE FOR INSTALLATION
- ONE SPARE



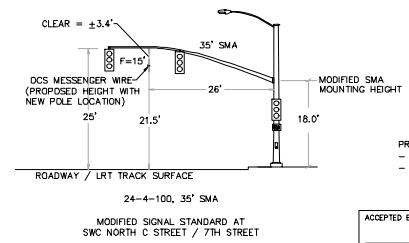
PROVIDE TWO SIGNAL STANDARDS
- ONE FOR INSTALLATION
- ONE SPARE



PROVIDE ONE SIGNAL STANDARD



PROVIDE TWO SIGNAL STANDARDS
- ONE FOR INSTALLATION
- ONE SPARE



PROVIDE TWO SIGNAL STANDARDS
- ONE FOR INSTALLATION
- ONE SPARE

ABBREVIATIONS:
LRT - LIGHT RAIL TRAIN
OCS - OVERHEAD CONTACT SYSTEM
SMA - SIGNAL MAST ARM
MAT - MAST ARM TOP

ORIGINAL SCALE IS IN INCHES
0 1 2 3

ACCEPTED BY: _____ DATE: _____
KALEB HALE, E-15137
SENIOR ELECTRICAL ENGINEER

REVISIONS				BENCH MARK	FIELD BOOK	CITY OF SACRAMENTO				OFF-SITE IMPROVEMENT PLANS FOR				SHEET
NO.	DESCRIPTION	DATE	BY	DESCRIPTION		DEPARTMENT OF PUBLIC WORKS				RICHARDS BLVD OFFICE COMPLEX				
				CITY BLK 2807-CIS	SCALE	TRAFFIC SIGNAL PLAN				K5 Anderson				TS-7
				PLAN SET IN TRAFFIC SIGNAL BASIN, SE CORNER	HORIZ. 1"=10'	DRAWN BY: _____				Transportation Engineers				
				OF RICHARDS BLVD. & SEDONA PARKING BLVD.	VERT. 1"=10'	DESIGN BY: M.RODIER				3853 Taylor Road, Suite G				OF
					FILED _____	R.C.E. _____				Loomis, California 95650				
						DATE: 6/18/21				CITY OF SACRAMENTO, CA				
						CHECKED BY: _____				JUNE 18, 2021 - SECOND SUBMITTAL				
						R.C.E. _____				P-15617-700				
										P-2027-019				

Anderson
Transportation Engineers
3853 Taylor Road, Suite G
Livermore, California 94550

JUNE 18, 2021 - SECOND SUBMITTAL

CP22-0002
P15611700
P15620719

CONDUCTOR SCHEDULE

CONDUIT RUN		1	2-3*	4	2-3*	5	2-3*	6	2-3*	7	2-3*	8	2-3*
CONDUCTORS		6 TO 4	4 TO 6	4 TO 6	4 TO 6	4 TO 4	6 TO 4	4 TO 6	6 TO 4	4 TO 6	4 TO 6	4 TO 4	6 TO 4
VEH. SIG. #3		6		3		3		3		3		3	
VEH. SIG. #4		3		6		3		3		3		3	
VEH. SIG. #6		3		6		3		3		3		3	
VEH. SIG. #8		3		3		3		3		3		3	
PED. SIG. #2		4		4		2		2		2		2	
PED. SIG. #4		2		2		2		2		2		2	
PPB #2		4		4		2		2		2		2	
PPB #4		4		4		4		2					
ø(T1)		2		2		2		2					
ø(T2)		2		2		2		2		2			
ACTIVATED SIGNS		6		6		2				6		2	
VIDEO DET. CAT. CABLE		4		4		1		1		2		1	
VIDEO DET. POWER CABLE		4		4		1		1		2		1	
CCTV CABLE		2		1									
EV GPS CABLE		1											
SPARES		1	3	1	3	1	3	1	3	1	3	1	3
SIG. NEUTRAL													
CONTROLLER POWER 2		1	3	1	1	1	1	1	2	1	1	2	1
GROUND													
ST LT. POWER		3		3		2		2		2		2	
TOTAL CONDUCTORS		2	8	3	11	3	8	3	11	2	2	4	12

CONDUCTOR SCHEDULE

CONDUIT RUN	2-3"	2-3"	2-3"	2-3"	2-3"	2-3"	2-3"
CONDUCTORS	6 TO 4	6 TO 4	6 TO 4	6 TO 4	6 TO 4	6 TO 4	6 TO 4
VEH. SIG. #2	6	3					
VEH. SIG. #5	6	3	3	3	3	3	
VEH. SIG. #6				3	3	3	
VEH. SIG. #8	6	3	3	3		3	
PED. SIG. #6	2	2	2	2	2		
PED. SIG. #8							
PPB #6	4	4	4	4	4	2	
PPB #8	4	4	2				
VIDEO DET. CAT CABLE	3	2	1				1
VIDEO DET. POWER CABLE	2	2	1				1
LOOP DET. #2	2						
LOOP DET. #6	2	2	2	2	2		
CCTV CABLE	2						2
EV GPS CABLE	1	1					
SPARES	3	1	3	1	3	3	3
SIG. NEUTRAL	1	3	1				
CONTROLLER POWER 2	2						
GROUND		1			1	1	1
ST LT POWER		3	1	2	2	2	2
TOTAL CONDUCTORS	22	36	33	22	27	25	22


CONDUCTOR SCHEDULE

CONDUIT RUN		2-3"		2-3"		2-3"		2-3"		3"		2-3"		2-3"		2-3"			
CONDUCTORS		6	10	4	6	4	6	10	4	6	10	4	6	10	4	6	10	4	6
VEH. SIG. #1	#3	6	3																
VEH. SIG. #4	#3			3															
VEH. SIG. #6	#3			3		3				3									
VEH. SIG. #8	#3			3															
PED. SIG. #4	#6	2				2			2										
PED. SIG. #6	#6	2				2								2					
PPB #4	#4			4		4			4										
PPB #6	#6			4											2				
ø(T1)		2				2								2					
ø(T2)			2																
ACTIVATED SIGNS		6			6			2							6			2	
VIDEO DET. CAT. CABLE			4		4			1		1						2			1
VIDEO DET. POWER CABLE								1		1						4			1
CCTV CABLE		2																	
EV GPS CABLE		1																	
SPARES			3			1		3			1		3		1		3		3
SIG. NEUTRAL																			
CONTROLLER POWER 2		2		1		1		1		1			1		1		1		
GROUND																			
ST LT. POWER						3		2		2					2		2		
TOTAL CONDUCTORS		2	8	2	11	3	8	2	11	2	2	15	2	11	2	8	14	2	12



ACCEPTED BY: _____ DATE: _____
KALEB HAILE, E-15137
SENIOR ELECTRICAL ENGINEER

THIS PLAN ACCURATE FOR ELECTRICAL WORK ONLY

REVISIONS NO. DESCRIPTION DATE BY				BENCH MARK ELEV. 73.048 (NAVD83) DESCRIPTION 100' N. & 20' W. OF 1/4" 36" IN. TRAFFIC SIGNAL BASE, S.E. CORNER OF RICHMOND BLVD. & SECONDA PACIFIC BLVD.		FIELD BOOK SCALE HORIZ. 1"=20' VERT. _____ DRAWN BY: MUECKER FILE: _____		CITY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS DESIGN BY: MUECKER R.C.E. DATE 6/18/21				OFF-SITE IMPROVEMENT PLANS FOR RICHARDS BLVD OFFICE COMPLEX TRAFFIC SIGNAL PLAN CONDUCTOR SCHEDULES CITY OF SACRAMENTO, CA CHECKED BY: KANDERSON R.C.E. DATE _____				 Transportation Engineers 3853 Taylor Road, Suite G Loomis, California 95650 JUNE 18, 2021 - SECOND SUBMITTAL		C:\P21\21-0022 101-0811700	JUNE 2021 018	SHEET TS-11 OF
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Attachment E

RBOC Final Traffic Operations Study

MEMO

To: John Webber, DGS; Wendy Andreotti, HP; Jamie Lynne Athenour, HP; Anthony Bruzzone, ARUP

From: Ken Anderson, KD Anderson & Associates, Inc.

Date: November 3, 2020

Re: RBOC: Final Traffic Operations Study for Traffic Signal DCR's

Traffic Operational Analysis for RBOC DCR's

Approach

This revised traffic analysis follows our April 30, 2020 report and addresses comments received from the City of Sacramento. This analysis makes use of SimTraffic simulation to evaluate the operation of existing and proposed traffic signals in the area of the Richards Boulevard Office Complex (RBOC) as required by the City of Sacramento to support Design Concept Reports (DCR) for new traffic signal and traffic signal modifications. The RBOC is located at the southwest corner of Richards Blvd / N. 7th Street as noted in Figure 1 (attached). Traffic volume forecasts created for the RBOC EIR and subsequently supplemented for the Department of General Services (DGS) were adjusted to account for the quantity of employment and on-site parking now proposed, as well as the location of site access, parking and drop-off /loading. SimTraffic networks created for the RBOC EIR and subsequent document were then adjusted to account for the current access and internal circulation proposal. Resulting traffic operations expressed in terms of intersection delays and peak turn lane queues were projected and used to evaluate the feasibility of proposed access and internal circulation.

KEY CONCLUSIONS

1. The three new signals proposed with the RBOC project are expected to operate with Levels of Service that satisfy the City of Sacramento's minimum LOS E standard in this area. However, conditions may be poorer during peak periods due to the effects of queuing from other intersections.
2. The overall flow of peak hour traffic in the area around RBOC is characterized by long queue of through traffic that extend through adjoining intersections. Under near term conditions the p.m. peak hour queue of westbound traffic on Richards Blvd is projected to extend back from the N. 5th Street intersection through N. 6th Street to N. 7th Street. In the eastbound direction, the through traffic queue created at N. 7th Street is expected to extend back through N. 6th Street to N. 5th Street in both the a.m. and p.m. peak hour. On N. 7th Street long queues are caused by the operation of the intersections south of RBOC. The southbound queues created at the Railyards Blvd and B Street intersections extend north through the two RBOC intersections, and in the evening that queue is projected to reach Richards Blvd. Long queues in other directions are found at locations south of the project site, but those queues do not directly affect the flow of traffic in the area of RBOC.

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It is important to note, however, that planned improvements along N. 7th Street that will accompany other approved development projects will improve traffic flow south of the RBOC area and reduce delays and queue lengths.

3. Left turn lane queues were evaluated from the standpoint of the design of individual intersections. In the eastbound direction the 95th percentile left turn queues on Richards Blvd at the N. 7th Street intersection is projected to would fill the left lane and make use of the Two-Way Left Turn area between the N. 6th Street and N. 7th Street intersections (refer to Table 6). However, visual review of the SimTraffic simulation reveals that eastbound through traffic is not impeded by queuing in the left turn lane.
4. Peak period 95th percentile left turn lane queues on N. 7th Street are projected to fill the area between the C Street and B Street intersections in the a.m. peak hour under Cumulative plus Project conditions (refer to Table 9). Review of simulation runs reveals that through traffic on N. 7th Street is sometimes blocked by spillover queues.
5. Earlier analysis suggested that in the short term left turn queueing in this area of N. 7th Street would be benefited by completion of other improvements that are not a part of the RBOC project but are expected to be completed by others (i.e., second southbound through lane on N. 7th Street south of B Street).
6. Preliminary alternatives evaluated at the N. 7th Street / C Street intersection included side street stop sign control on C Street and a northbound left turn prohibition with a traffic signal. However, those alternatives have been rejected due to the need for a traffic signal to accommodate the volume of traffic across the LRT tracks and due to the absence of alternative access to the RBOC in the near term.
7. Design decisions regarding access at N. 7th Street / C Street should consider the opportunities for alternative access that may be absent today but will be available in the future, as well as the relative effect on the RBOC project. In the short term eliminating northbound left turns at C Street would add traffic onto Bannon Street and could increase conflicts with the drop-off and loading functions on that street. However, in the long term the anticipated extensions of 5th and 6th Streets to Railyards Blvd would compensate for the absence of northbound left turns at C Street, if that prohibition proved to be necessary in the future.
8. The effects of internal RBOC circulation on the design of new traffic signals has been evaluated. While not related to the design of the N. 7th Street / C Street intersection itself, the queue of southbound through traffic on N. 7th Street caused by the operation of downstream traffic signals is projected to result in eastbound C Street queues that extend to the parking structure entrance. While not evident from simulation, uncontrolled pedestrian activity at the Bannon Street pedestrian crossing could result in peak period westbound queues that extend to the N. 7th Street signal.

BACKGROUND INFORMATION

Project Description

As noted in Figure 2 (attached), the RBOC proposes signalized vehicular and pedestrian access at the following locations which would be the subject of Design Concept Reports (DCR's):

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- New traffic signal at Richards Blvd / N. 6th Street
- Traffic signal modification at Richards Blvd / N. 7th Street
- New traffic signal at N. 7th Street / Bannon Street
- New traffic signal at N. 7th Street / C Street
- Minor traffic signal modification at N. 7th Street / B Street

The RBOC includes a 1,294 space parking garage with access to C Street between N. 6th Street and N. 7th Street and to N. 6th Street between Richards Blvd and Bannon Street, as well as surface parking for visitors and employees with access to C Street. The RBOC includes designated drop-off and loading areas on Bannon Street as well as a pedestrian crossing on Bannon Street linking RBOC's office towers with the parking structure. No direct access to the project's parking areas is planned via Bannon Street.

Traffic Volume Forecasts

Resources. The approach to preparing these traffic volume forecasts makes use of information developed for the RBOC DEIR, including the DEIR Transportation and Circulation Element (TCE) and DEIR Appendix G Transportation Data (GTD), as well as supplemental data provided by Fehr and Peers (F&P) for DGS in September 2019. The TCE identifies baseline plus project and cumulative plus project a.m. and p.m. peak hour traffic volume data for 15 locations, including generalized RBOC access points on 7th Street and on Richards Blvd. The TCE also identifies the regional trip distribution assumptions made for the project. GTD data includes assumptions relating to RBOC employee travel mode and schedule which supplement the DEIR's trip generation estimate. The supplemental F&P data addressed a revised project occupancy load, and its forecasts also reflect refined assumptions for site access and circulation. Those assumptions included the extension of Bannon Street westerly to 6th Street as a drop-off / loading area, the extension of C Street west of 7th Street and the extension of 6th Street south through Bannon Street to C Street. These assumptions for circulation are consistent with the RBOC project now proposed.

Assumptions for Baseline Plus Project Forecasts. The approach taken to create traffic volume forecasts for this analysis makes use of the work done by F&P as the starting point and accounts for RBOC project changes in comparison to the F&P assumptions. Table 1 compares the assumptions and trip generation forecasts made under each resource.

The general on-site employment will be slightly more than was noted in the F&P work under baseline conditions but will ultimately reach 5,000 persons. Because the difference between the F&P assumption and the current opening day employment is very small (i.e., 105 employees), the RBOC trip generation forecasts is initially based on F&P opening day employment, but the cumulative (i.e., 20 year) trip generation is assumed to be proportionately greater in the future when 5,000 employees may be on the site.

The project now proposed will contain 210 more parking spaces than assumed in the TCE or by F&P. The peak hour traffic associated with these spaces has been estimated based on the share of all employee commute trips occurring in the a.m. peak hour (47.5%) and the p.m. peak hour (62.3%) noted in the GTD. A total of 100 a.m. and 130 p.m. trips are forecast. These additional trips have been assumed to increase the volume in or out of the site at the Richards Blvd / 6th Street and N. 7th Street / C Street intersections in proportion to the volumes identified by F&P.

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TABLE 1 RBOC ASSUMPTIONS / TRIP GENERATION			
Description	DEIR TCE	F&P 9/2019	Current RBOC
Parking spaces	1,420	1,420	1,630
Building size	1,375 ksf	1,375 ksf	1,250 ksf
Employees	6,000	4,545 ¹	4,650 opening day 5,000 ultimate
Richards Blvd Access	Roughly 6 th Street	6 th Street	6 th Street
7 th Street Access	Roughly Bannon Street	at Bannon Street to support drop-off and loading activities	at Bannon Street to support drop-off and loading activities
		at C Street	at C Street
AM Trip Generation	1,416 in / 412 out	1,154 in / 191 out	1,154 in / 191 out 1,269 in / 210 out 20 yr
PM Trip Generation	611 in / 1,957 out	310 in / 1,600 out	310 in / 1,600 out 331 in / 1,760 out 20 yr
Sum of AM driveways	988 in / 420 out	1,001 in / 579 out	1,101 in / 579 out ²
Sum of PM driveways	617 in / 1,352 out	315 in / 1,059 out	315 in / 1,189 out ³
Sum of AM driveways 20 yr	1,120 in / 475 out		1,120 in / 475 out
Sum of PM driveways 20 yr	650 in / 1,080 out		650 in / 1,080 out
¹ represents number of employees present on typical midweek day considering those that telecommute, work part time or work from field offices. ² assumes 100 more inbound trips based on 210 additional spaces with 47.5% filling in the a.m. peak hour ³ assumes 130 more outbound trips based on 210 additional spaces and 62.3% existing in the p.m. peak hour			

As noted in the DEIR TCE, the presence of additional parking would have the effect of diverting some traffic by employees who would otherwise park elsewhere or use a ride hailing service. Thus, the presence of additional parking would have no effect on the amount of a.m. traffic into the area or outbound p.m. peak hour traffic on a regional basis. By eliminating the second leg of a ride hailing trip, the overall volume of project traffic could be reduced.

The following steps were taken to create the Baseline plus Project peak hour forecasts for this analysis.

1. Started with F&P September a.m. and p.m. peak hour forecasts.
2. Add trips specifically related to the additional garage space to the F&P forecasts for site access and to the intersections within two blocks of the site.
3. To present a conservative assessment, assume no reduction in traffic anywhere due to elimination of the second leg of some ride-hail trips.
4. Distribute identified traffic volumes to and from on-site parking garage and parking lot access and through drop-off and loadings areas.

Baseline Plus Project Peak Hour Traffic Volume Forecasts. Figure 3 (attached) illustrates study locations. Figure 4 (attached) illustrates the a.m. and p.m. peak hour traffic volume forecasts used in this analysis.

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Assumptions for Cumulative plus Project Forecasts. The DEIR TCE presents Cumulative plus Project volumes which yield driveway trip totals that were somewhat different from the baseline forecasts. Among other reasons, the TCE attributed trip generation changes to the presence of additional parking in the Riverfront area and a corresponding decrease in RBOC drop-off activity. For this analysis the following steps were taken to create the Cumulative plus Project volumes to be used for simulation analysis.

1. Started with TCE traffic volume forecasts.
2. Identified the difference in turning movement volumes under Cumulative no Project and Cumulative plus Project conditions.
3. Adjusted that difference based on the ratio of the ultimate employment now anticipated (i.e., 5,000) and the TCE ultimate employment estimate (i.e., 5,000 / 6,000 or 17% reduction).
4. Added the adjusted difference to the Cumulative no Project volumes at study intersections.

For RBOC access points it was necessary to consider adjusting the TCE volumes to account for reduced site employment as well as increased on-site parking. The change in employment (17% reduction) was assumed to be generally balanced by the change in onsite parking (20% increase), and the TCE driveways total were assumed to remain applicable.

However, because the TCE assumed only one access on N. 7th Street, it was necessary to manually adjust the TCE's Richards Blvd driveway volume forecasts to account for the presence of the N. 7th Street / C Street access. This was accomplished by dividing the volumes between Bannon Street and C Street in general proportion to the driveway use identified under Baseline conditions. Resulting traffic volumes were subsequently distributed to on-site parking and drop-off loading areas.

Cumulative Plus Project Peak Hour Traffic Volume Forecasts. Figure 5 (attached) illustrates the a.m. and p.m. peak hour traffic Cumulative plus Project volume forecasts proposed for use in this analysis.

SIMULATION

Simulation Assumptions

Source. SimTraffic simulation networks were created for the RBOC TCE and subsequent study and were made available for this analysis. Those networks covered that area addressed in the traffic volume forecasts noted earlier and included Richards Blvd from Interstate 5 to N. 16th Street and N. 7th Street from Richards Blvd to Railyards Avenue. The existing light rail crossings on N. 7th Street at Richards Blvd and at B Street were included in the networks. Existing and Cumulative plus Project a.m./p.m. DEIR models were employed. In addition, Baseline plus RBOC models created for DGS in September 2019 were also provided and employed.

Adjustments. In addition to incorporating the traffic volumes noted above, the simulation models were modified to reflect the currently proposed intersection geometry at each intersection, the presence of two new Light Rail Crossings on N. 7th Street and the location of on-site facilities. The models were also modified to reflect pending light rail schedule changes (i.e., 15-minute headways in each direction).

Decisions were made with regards to other improvements that may be made outside of the scope of work included in the RBOC project, particularly at the N. 7th Street / B Street. While the RBOC project will improve the NW corner of the intersection, subsequent improvements to the SW corner and on N. 7th Street to the south will be made by other pending development. These improvements are assumed in the

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cumulative condition, and the use of mixed-use transit-automobile lanes on southbound N. 7th Street in the area north of B Street was confirmed in consultation with City of Sacramento staff. The baseline condition assumes the SW corner improvements are not made.

The simulation models reflect applicable pedestrian activity. On N. 7th Street a pedestrian crossing is planned at the N. 7th Street / Bannon Street intersection, but no crossing on N. 7th Street is planned at the C Street crossing. An east side pedestrian crossing of Richards Blvd is planned at the N. 6th Street / Richards Blvd intersection. This location was assumed to share the appreciable pedestrian traffic between RBOC and the Township 9 LRT station with the N. 7th Street intersection. Internally, pedestrian activity at the Bannon Street crossing commensurate with parking garage use and employee schedule distribution (i.e., 1,200± pedestrians per hour) was input to the model.

The simulation model considers bicycle access issues at the N. 7th Street / Richards Blvd intersection created by the two-way cycle track on the west side of Richards Blvd. That facility ends on the southwest corner of the intersection, and northbound bicyclists may wish to turn left across the LRT tracks to head west or may need to cross the intersection to continue north. While preliminary alternatives consider whether these movements might be facilitated by an exclusive bicycle phase which holds automobile traffic, exiting northbound bicyclists will be mixed with pedestrians across Richards Blvd.

The simulation models were adjusted to reflect use of the Bannon Street pedestrian crossing and drop-off loading areas. The Bannon Street pedestrian crossing does not include active vehicular traffic controls but the crossing itself has been narrowed and accompanied by raised curbs. In this case motor vehicles would legally have the right of way through the crossing but are not to enter the crossing when already occupied by pedestrians. This location was represented in the model as a low speed (i.e., 10 mph) all-way stop controlled intersection to reflect the interaction between pedestrians and vehicular traffic on Bannon Street using drop-off / loading areas.

Traffic Signal Operational Assumptions The simulation models reflect proposed traffic signal coordination assumptions. Under both Baseline plus Project and Cumulative plus Project Conditions existing coordination on Richards Blvd from N. 5th Street westerly and from N. 10th Street easterly was assumed to continue.

Under near term conditions the N. 7th Street / Richards Blvd intersection continues to be isolated. On Richards Blvd the operation of the N. 6th Street traffic signals was coordinated in both directions with the signal to the west. On N. 7th Street the signals were coordinated in the southbound direction at B Street and in the northbound and southbound directions at Bannon Street and C Street.

Slightly different coordination was used under Cumulative conditions. The N. 6th Street signals on Richards Blvd were coordinated in both directions. On N. 7th Street the signals were coordinated in both northbound and southbound directions from Bannon Street to B Street in the a.m. peak hour. In the p.m. the signals were coordinated in the southbound direction with northbound and southbound coordination at C Street and Bannon Street.

The simulation models included a 10-minute seeding period and a 15-minute simulation period. Ten runs were made, the outlying high and low runs were eliminated, and the average of the eight middle runs has been reported.

Microsimulation reflects the effects of random traffic flow variation, and in the case of locations adjoining light rail crossings, the random timing of light rail trains. Light rail trains can disrupt the flow of

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background traffic and cause congestion that generally dissipates over the course of several traffic signal cycles. The overall effects of light rail activity on average intersection delay and queueing reported as a byproduct of simulation can vary greatly from run to run and depending on the point in the simulation run when the train arrives.

Simulation Results

Simulation results are attached and include intersection delay and 50th and 95th percentile vehicle queue information. The simulations addressed all intersections included in the RBOC EIR analysis, and the results are included in the appendix.

Levels of Service. Table 2 presents Baseline plus RBOC Levels of Service at the three access locations and at four adjoining intersections. Table 3 presents similar information for Cumulative plus Project conditions. These results were compared to City of Sacramento standards as outlined in policy M1.2.2. That policy notes that LOS E is acceptable for this project because it is within ½ mile of a light rail station.

Review of Levels of Service results reveals that poor conditions are projected at off-site locations on N. 7th Street south of the project, and these conditions at may affect the operation of RBOC intersections. LOS F conditions with very long delays are forecast at the N. 7th Street / B Street and N. 7th Street / Railyards Blvd intersections. These conditions are primarily the result of the limited capacity at these locations. While planned improvements that are not a part of the RBOC would add travel lanes, increase the capacity of these intersections and improve the Level of Service, until those improvements are installed the operation of these intersections effectively meters the flow of northbound 7th Street traffic into the area of RBOC but also causes appreciable delays for southbound traffic that are not reflected in the intersection delay reports at upstream intersections. Thus, conditions at RBOC intersection on N. 7th Street may be worse than projected during peak periods.

Peak Period Queues. Table 4 presents the Average and 95th percentile queue length forecasts for left turn lanes and for other lanes at intersections in the vicinity of RBOC. Table 5 presents similar information under Cumulative plus RBOC conditions. Queue tables also present the length of current and proposed left turn lane lengths unless otherwise noted, and queues longer than storage are in **Bold**. The forecast queue are also illustrated in Figures 6-14.

The overall flow of traffic through the area of RBOC can be characterized based on the presence of through queues that extend back through adjoining intersections. For example, in the p.m. peak hour the queue of westbound traffic on Richards Blvd is projected to extend back from the N. 5th Street intersection through N. 6th Street to N. 7th Street. In the eastbound direction, the through traffic queues created at N. 7th Street extend back through N. 6th Street and to N. 5th Street in both the a.m. and p.m. peak hour. On N. 7th Street through traffic queues are caused by the operation of the intersections south of RBOC. The southbound queues created at the Railyards Blvd and B Street intersections extend north through the two RBOC intersections, and in the evening the southbound queue is projected to reach Richards Blvd. Long queues are found in other directions at the locations south of the project site, but these queues do not directly affect the flow of traffic in the area of RBOC.

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TABLE 2 BASELINE PLUS RBOC AM/PM PEAK HOUR LEVELS OF SERVICE						
#	Intersection	Baseline Plus Project Conditions				
		AM Peak Hour			PM Peak Hour	
		Control	Ave Delay (sec/veh)	LOS	Ave Delay (sec/veh)	LOS
6	N. 5 th St / Richards Blvd	Signal	18	B	15	B
7	N. 7 th St / Richards Blvd	Signal	55	E	71	E
11	N. 7 th St / Bannon Street	Signal	21	C	21	C
12	N. 7 th St / B Street	Signal	98	F	67	E
14	N. 7 th St / Railyards Blvd	Signal	20	C	320	F
15	N. 6 th St / Richards Blvd	Signal	40	D	29	C
16	N. 7 th St / C Street	Signal	21	C	26	C
HIGHLIGHTED locations are RBOC access intersections						

TABLE 3 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR LEVELS OF SERVICE						
#	Intersection	Baseline Plus Project Conditions				
		AM Peak Hour			PM Peak Hour	
		Control	Ave Delay (sec/veh)	LOS	Ave Delay (sec/veh)	LOS
6	N. 5 th St / Richards Blvd	Signal	19	B	36	D
7	N. 7 th St / Richards Blvd	Signal	54	D	148	F
11	N. 7 th St / Bannon Street	Signal	17	B	24	C
12	N. 7 th St / B Street	Signal	83	F	119	F
14	N. 7 th St / Railyards Blvd	Signal	92	F	261	F
15	N. 6 th St / Richards Blvd	Signal	21	C	43	D
16	N. 7 th St / C Street	Signal	19	C	30	C
HIGHLIGHTED locations are RBOC access intersections						

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TABLE 4 BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES								
#	Intersection	AM Peak Hour				PM Peak Hour		
		Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
				Average	95 th %		Average	95 th %
6	N. 5 th St / Richards Blvd							
	• Westbound left	100	10	<25	35	8	<25	45
	• WB thru+rt	325	783	60	130	1,783	200	435
	• EB thru+rt	625	1,540	90	225	860	50	145
7	N. 7 th St / Richards Blvd							
	• Eastbound left	180 ¹	192	180	275	10	30	130
	• EB thru+rt	535	943	360	525	872	445	510
	• Northbound left	150 ²	41	<25	45	352	110	190
	• NB thru+rt	475	180	140	240	556	225	445
	• Southbound left	140	13	<25	40	87	110	205
	• SB thru	250	37	<25	55	119	190	345
	• SB right	110	20	<25	55	77	125	200
	• Westbound left	190 ³	488	350	650	297	335	555
• WB thru+rt	1,090	801	205	525	1,040	360	540	
11	N. 7 th St / Bannon Street							
	• Southbound left	None	0	0	0		0	0
	• SB thru+rt	475	627	210	460	503	230	445
	• Northbound left	120 ⁴	161	90	170	31	<25	75
	• NB thru	320	103	30	85	738	95	255
	• Eastbound left	205 ⁵	117	85	134	159	195	340
	• Eastbound right	205	128	175	320	124	110	260
12	N. 7 th St / B Street							
	• Southbound left	140 ⁶	24	<25	65	91	40	125
	• SB thru+rt	190	629	235	290	647	230	290
	• NB left+thru+rt	995	364	780	1,090	1,004	1,005	1,030
	• EB left+thru+rt	1,250	178	110	200	150	120	210
	• WB left+thru	1,100	336	635	940	265	410	710
	• WB right turn	1,100	49	145	585	47	25	50
WB Richards Blvd Queue			EB Richards Blvd Queue				SB N. 7 th St Queue	
<div><div>¹ lane is followed by 185 foot Two-Way left-Turn (TWLT) lane</div><div>² lane continues as (TWLT) to Bannon Street, a total distance of 470 feet</div><div>³ lane continues as a TWLT lane to N. 10th Street, a total distance of 880 feet</div><div>⁴ lane is followed by a 215 foot TWLT lane to C Street. Total is 335 feet.</div><div>⁵ distance to pedestrian crossing</div><div>⁶ lane is followed by 40 foot bay taper and 60 feet of northbound LT to C Street</div></div>								

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TABLE 4 (continued) BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES								
#	Intersection	AM Peak Hour				PM Peak Hour		
		Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
				Average	95 th %		Average	95 th %
14	N. 7 th S / Railyards Blvd							
	• NB thru+lt	1,375	124	65	135	403	1,100	1,460
	• SB thru+rt	1,000	1,020	195	365	883	550	850
	• Eastbound left	125	256	115	210	659	2,530	3,110
	• Eastbound right	320	107	55	100	62	40	160
15	N. 6 th St / Richards Blvd							
	• Westbound left	170 ⁷	103	70	130	34	40	135
	• Westbound thru	535	675	105	250	1,455	290	465
	• EB thru+rt	325	1,553	430	650	863	225	465
	• Northbound left	440 ⁸	78	35	70	336	110	140
	• NB right	440	35	<25	40	173	140	305
16	N. 7 th St / C Street							
	• Northbound left	60 ⁹	98	65	120	42	<25	40
	• NB thru	265	227	65	155	535	50	125
	• SB thru+rt	190	700	250	400	607	310	405
	• Eastbound left	250 ¹⁰	37	45	125	234	175	325
	• Eastbound right	250	184	200	405	163	195	335
WB Richards Blvd Queue			EB Richards Blvd Queue				SB N. 7 th St Queue	
7 lane is followed by 185 foot TWLT lane 8 distance to Bannon Street 9 60 foot lane followed by 40 foot bay taper and 140 feet SB LT to C Street 10 distance to garage								

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TABLE 5 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES								
#	Intersection	AM Peak Hour				PM Peak Hour		
		Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
				Average	95 th %		Average	95 th %
6	N. 5 th St / Richards Blvd							
	• Westbound left	100	240	110	145	265	115	155
	• WB thru+rt	325	1,205	150	320	1,315	185	365
	• EB thru+rt	625	1,450	55	130	1,070	315	590
7	N. 7 th St / Richards Blvd							
	• Eastbound left	180 ¹	175	165	265	5	<25	60
	• EB thru+rt	535	1,190	360	540	1,075	455	520
	• Northbound left	150 ²	225	90	155	230	235	515
	• NB thru+rt	475	380	200	335	380	395	575
	• Southbound left	140	35	40	135	80	80	215
	• SB thru	250	210	185	310	400	2,025	2,995
	• SB right	110	30	45	135	50	40	135
	• Westbound left	190 ³	395	235	395	495	715	955
• WB thru+rt	1,090	1,180	245	450	1,125	440	1,065	
11	N. 7 th St / Bannon Street							
	• Southbound left	150	30	30	85	100	70	155
	• SB thru+rt	475	750	145	260	1,145	150	295
	• Northbound left	120 ⁴	70	45	95	50	50	120
	• NB thru	320	410	45	105	690	150	290
	• Eastbound left	205 ⁵	115	150	250	100	155	270
	• EB thru+right	205	145	45	115	145	150	295
12	N. 7 th St / B Street							
	• Southbound left	140 ⁶	165	115	150	265	120	130
	• SB thru+rt	190	600	200	290	1,005	230	305
	• Northbound left	unk	55	45	120	85	35	80
	• NB thru+rt	995	550	270	425	1,145	490	505
	• Eastbound left	unk	95	70	145	130	100	155
	• EB thru+rt	unk	430	730	1,215	480	1,935	2,740
	• WB left	1,100	720	465	725	405	460	820
• WB thru+rt	1,100	710	380	690	650	630	1,040	
WB Richards Blvd Queue			EB Richards Blvd Queue				SB N. 7 th St Queue	
¹ lane is followed by 185 foot TWLT lane ² lane continues as TWLT to Bannon Street, a total distance of 470 feet ³ land continues as a TWLT lane to N. 10 th Street, a total distance of 880 feet ⁴ lane is followed by 215 foot TWLT lane to C Street. Total is 335 feet. ⁵ distance to pedestrian crossing ⁶ lane is followed by 40 foot bay taper and 60 feet of northbound LT to C Street								

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TABLE 5 (continued) CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES								
#	Intersection	AM Peak Hour				PM Peak Hour		
		Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
				Average	95 th %		Average	95 th %
14	<i>N. 7th S / Railyards Blvd</i>							
	• Northbound left	unk	315	220	255	270	150	260
	• NB thru+lt	1,375	875	545	995	1,040	3,800	5,190
	• Southbound left	unk	25	<25	60	40	60	140
	• SB thru+rt	1,000	940	250	375	910	205	350
	• Eastbound left	125	295	175	240	375	185	210
	• EB thru	320	435	1,160	1,815	500	4,440	5,940
	• EB right	unk	425	265	830	565	4,155	6,010
	• Westbound left	unk	455	275	275	385	275	285
• WB thru+rt	unk	425	1,240	1,315	390	1,455	1,905	
15	<i>N. 6th St / Richards Blvd</i>							
	• Westbound left	170 ⁷	150	115	225	185	105	200
	• Westbound thru	535	1,260	135	335	1,205	125	225
	• EB thru+rt	325	1,795	205	445	1,320	520	595
	• Northbound left	440 ⁸	190	95	140	420	270	440
	• NB right	440	30	35	105	20	<25	65
16	<i>N. 7th St / C Street</i>							
	• Northbound left	60 ⁹	110	80	130	50	40	100
	• NB thru	265	445	45	155	465	80	180
	• SB thru+rt	190	925	135	315	1,165	250	400
	• Eastbound left	250 ¹⁰	35	45	120	275	155	270
	• Eastbound right	250	40	55	225	120	150	295
WB Richards Blvd Queue			EB Richards Blvd Queue				SB N. 7 th St Queue	
7 lane is followed by 185 foot TWLT lane 8 distance to Bannon Street 9 60 foot lane followed by 40 foot bay taper and 140 foot southbound LT at B Street 10 distance to garage								

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Access Assessment

The following key findings were made based on review of this information and observation of simulation results.

Levels of Service at Access Intersections. The three access intersections are projected to operate with Levels of Service that satisfy the City of Sacramento's minimum LOS E standard under both Baseline plus RBOC and Cumulative plus RBOC conditions. However as noted earlier, while the combinations of traffic volume and intersection capacity at each location project LOS E or better conditions, the projected average delays do not fully account for the effects of queueing from downstream intersections that may delay traffic into and out of the site. Average delays could be longer.

Queues on Richards Blvd between N. 6th Street and N. 7th Street. The extent to which anticipated left turn queues can be accommodated within the space available between the N. 6th Street and N. 7th Street intersections. The RBOC project striping plans in each area propose designated turn lanes and Two-Way Left-Turn (TWLT) lane. Table 6 compares these distances with the anticipated queue lengths under Baseline plus Project and Cumulative plus Project conditions.

As indicated, the 95th percentile queues can be accommodated in the area between the two intersections, although the queues will extend into the TWLT lane area. Observation of the simulation results reveals that the turn lane queues do not spillover and interfere with through traffic. No alternatives for these intersection have been assessed.

TABLE 6 RICHARD BLVD QUEUES – N. 6 th STREET TO N. 7 th STREET											
Westbound Left Turn Lane at N. 6 th Street						Eastbound Left Turn Lane at N. 7 th Street					
Element	Length (feet)	95 th Percentile Queue (feet)				Element	Length (feet)	95 th Percentile Queue			
		Baseline plus RBOC		Cumulative plus RBOC				Baseline plus RBOC		Cumulative plus RBOC	
		AM	PM	AM	PM			AM	PM	AM	PM
Turn Lane	170					Turn Lane	180				
TWLT lane	185					TWLT lane	35				
Total	355	130	135	225	200	Total	215	275	130	265	60

Queues on N. 7th Street between Richards Blvd and Bannon Street. The extent to which anticipated left turn queues can be accommodated within the space available between these intersections was evaluated.

The project striping plans in each area proposed designated turn lanes and TWLT lane. Table 7 compares these distances with the anticipated queue lengths under Baseline plus Project and Cumulative plus Project conditions. As indicated, in the near term the entire 470 feet of separation between the intersections would all be available for the northbound queue. The projected queue is far less than this distance. When Bannon Street is extended easterly in the future, the area of N. 7th Street between Richards Blvd and Bannon Street might be striped with separate left turn lanes at each intersection, and another 170 feet of TWLT separation could be available between turn lanes. Under the Cumulative plus Project conditions the northbound 95th

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percentile queue may reach Bannon Street in the p.m. peak hour, and the sum of northbound and southbound queues could exceed the available distance between intersections. However, this conflict did not appear in viewing the simulation.

TABLE 7 N. 7 th STREET QUEUES – RICHARDS BLVD TO BANNON STREET											
Northbound Left Turn Lanes at Richards Blvd						Southbound Left Turn Lane at Bannon Street					
Element	Length (feet)	95 th Percentile Queue (feet)				Element	Length (feet)	95 th Percentile Queue			
		Baseline plus RBOC		Cumulative plus RBOC				Baseline plus RBOC		Cumulative plus RBOC	
		AM	PM	AM	PM			AM	PM	AM	PM
Turn Lane	150					Turn Lane	150				
TWLT lane	170 ¹					Separation	170				
Total	320	45	190	155	515	Total	320	n.a.	n.a.	100	155
Total Both Queues		45	190	255	670						

¹separation to end of future SB left turn lane at Bannon Street

¹separation to end of future SB left turn lane at Bannon Street

Queues on N. 7th Street between Bannon Street and C Street. The extent to which anticipated left turn queues can be accommodated within the space available between these intersections was evaluated.

The project striping plans in each area proposes a designated turn lanes and TWLT lane to the limit of the C Street intersection. Table 8 compares these distances with the anticipated queue lengths under Baseline plus Project and Cumulative plus Project conditions. As shown the projected queues approaching Bannon Street do not extend to C Street.

Westbound Bannon Street. In addition to the effects of intersection traffic operations, the queue in the northbound left turn lane is related to the operation of westbound Bannon Street. In this area 135 feet of curb-side drop-off will be provided on the north side of the street between N. 7th Street and the pedestrian crossing. This area can accommodate 5-6 vehicles concurrently. The raised pedestrian crossing is located 200 feet beyond N. 7th Street. Bannon Street has been narrowed to two travel lanes (i.e., 24 feet) with curb bulb outs. More than 1,000 pedestrian crossing per hour are anticipated. Formal automobile traffic or pedestrian traffic controls are not planned. Automobiles would have the right of way at the crossing but cannot legally enter the crossing when occupied by pedestrians. Under these circumstances it is likely that a queue of westbound traffic will extend back from the crossing towards N. 7th Street, and the simulation confirms queuing. It is possible that northbound traffic turning left may sit through more than one cycle and that the projected queue could be longer than estimated.

KDA

TABLE 8 N. 7 th STREET QUEUES – BANNON STREET TO C STREET											
Northbound Left Turn Lanes at Bannon Street						Southbound Left Turn Lane at C Street					
Element	Length (feet)	95 th Percentile Queue (feet)				Element	Length (feet)	95 th Percentile Queue			
		Baseline plus RBOC		Cumulative plus RBOC				Baseline plus RBOC		Cumulative plus RBOC	
		AM	PM	AM	PM			AM	PM	AM	PM
Turn Lane	120					Turn Lane	n.a.				
TWLT lane	215					Separation	n.a.				
Total	335	170	75	95	120	Total	n.a.	n.a.	n.a.	n.a.	n.a.

Queues on N. 7th Street between C Street and B Street. The extent to which anticipated left turn queues can be accommodated within the space available between these intersections was evaluated, as noted in Table 9.

The segment of N. 7th Street in this area includes a 140 foot-long southbound left turn lane at B Street, and from that point northerly the street is striped with a reversing bay taper and 60 foot northbound left turn lane at C Street. The distance from the limit of the C Street intersection to the left turn lane limit line at B Street is 240 feet. Table 9 compares this distance with the anticipated queue lengths under Baseline plus Project and Cumulative plus Project conditions.

At this location the two abutting queues might need to be accommodated concurrently in this 240-foot area. In the a.m. peak hour the sum of concurrent queues is projected to be more than 240 feet under Cumulative plus Project conditions. Because the peak queues are not forecast to occur concurrently, the simulation runs revealed that no spillover occurred under Existing plus Project condition but that southbound through traffic was impeded by spillover queues under Cumulative plus Project conditions.

TABLE 9 N. 7 th STREET QUEUES – C STREET TO B STREET											
Northbound Left Turn Lanes at C Street						Southbound Left Turn Lane at B Street					
Element	Length (feet)	95 th Percentile Queue (feet)				Element	Length (feet)	95 th Percentile Queue			
		Baseline plus RBOC		Cumulative plus RBOC				Baseline plus RBOC		Cumulative plus RBOC	
		AM	PM	AM	PM			AM	PM	AM	PM
Turn Lane	60					Turn Lane	140				
Bay Taper	40					Bay Taper	40				
Turn Lane	140					Turn Lane	60				
Total	240	120	40	130	100	Total	240	65	125	150	130
Total Both Queues		185	165	280	230						

KDA

Alternatives. In the short term conditions at this location would change with the implementation of improvements that are not included in the scope of the RBOC project but will be installed by other Railyard area projects (i.e., widening of N. 7th Street south of B Street).

Alternatives to full signalized access at the N. 7th Street / C Street intersection were considered but rejected. These alternatives are:

- Unsignalized N. 7th Street / C Street intersection with full access
- Partial traffic signal with northbound left turn prohibited

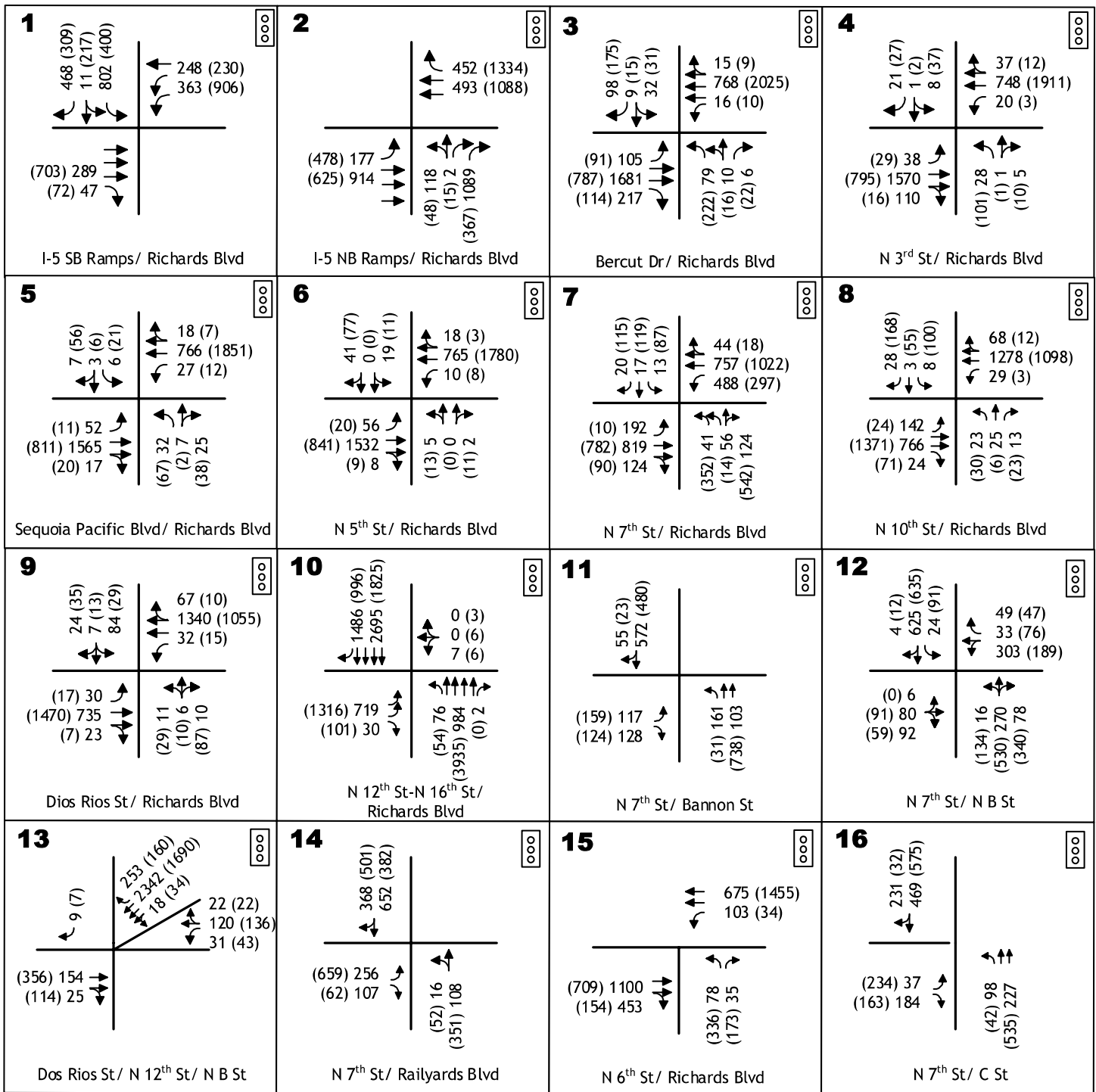
Decisions regarding access to this location needs to consider the opportunities for alternative access that may be absent today but will be available in the future, as well as the effects of alternative traffic patterns through the RBOC site. In the short term eliminating northbound left turn at C street would add traffic onto Bannon Street and which could exacerbate conflicts with the drop-off and loading functions on that street and at the pedestrian crossing. In the long term the anticipated extensions of 5th and 6th Streets to Railyards Blvd could compensate for the absence of a northbound left turn at C Street if necessary, but in the near term extending N. 6th Street to B Street is beyond the scope of the RBOC project. The removal of a traffic signal at C Street would result in a large volume of traffic crossing the LRT tracks at an uncontrolled crossing. This alternative is unlikely to be accepted by SacRT or by the California Public Utilities Commission.

Westbound C Street. As with the N. 7th Street / Bannon Street traffic signal, the flow of westbound traffic on C Street would be a consideration in the evaluation of the C Street signal. In this case the gated access to the parking lots and to the parking structure would be the primary issue. The extent to which traffic from these locations could queue back to N. 7th Street is related to the gate capacity and resulting vehicle headways. The two garage gates employ proximity sensors to detect and validate the license plate of an entering vehicle. Under this system each gate has a practical capacity of about 600 vehicles per hour (vph), and the combined capacity of the garage's four gates is 2,400 vehicles per hour. At this rate the site's 1,630 spaces could be filled in 40 minutes. A practical matter the flow rate from N. 7th Street and from Richards Blvd to the garages is somewhat metered by signal timing at the adjoining intersections, and the garage entrance capacity at each entrance (i.e., 1,200 vph) exceeds the flow rate out of the traffic signals into RBOC. As a result, queuing from the garages back to N. 7th Street is not anticipated in the simulation.

Eastbound C Street. In the evening traffic will flow out of the garage and parking lots and into the N. 7th Street intersection. While delays to eastbound RBOC traffic do not affect the flow of background traffic on N. 7th Street, the queue of southbound through traffic on N. 7th Street does affect outbound RBOC traffic. As noted in Tables 4 and 5 those queues are projected to result in eastbound queues on C Street that extend back to the garage entrance.

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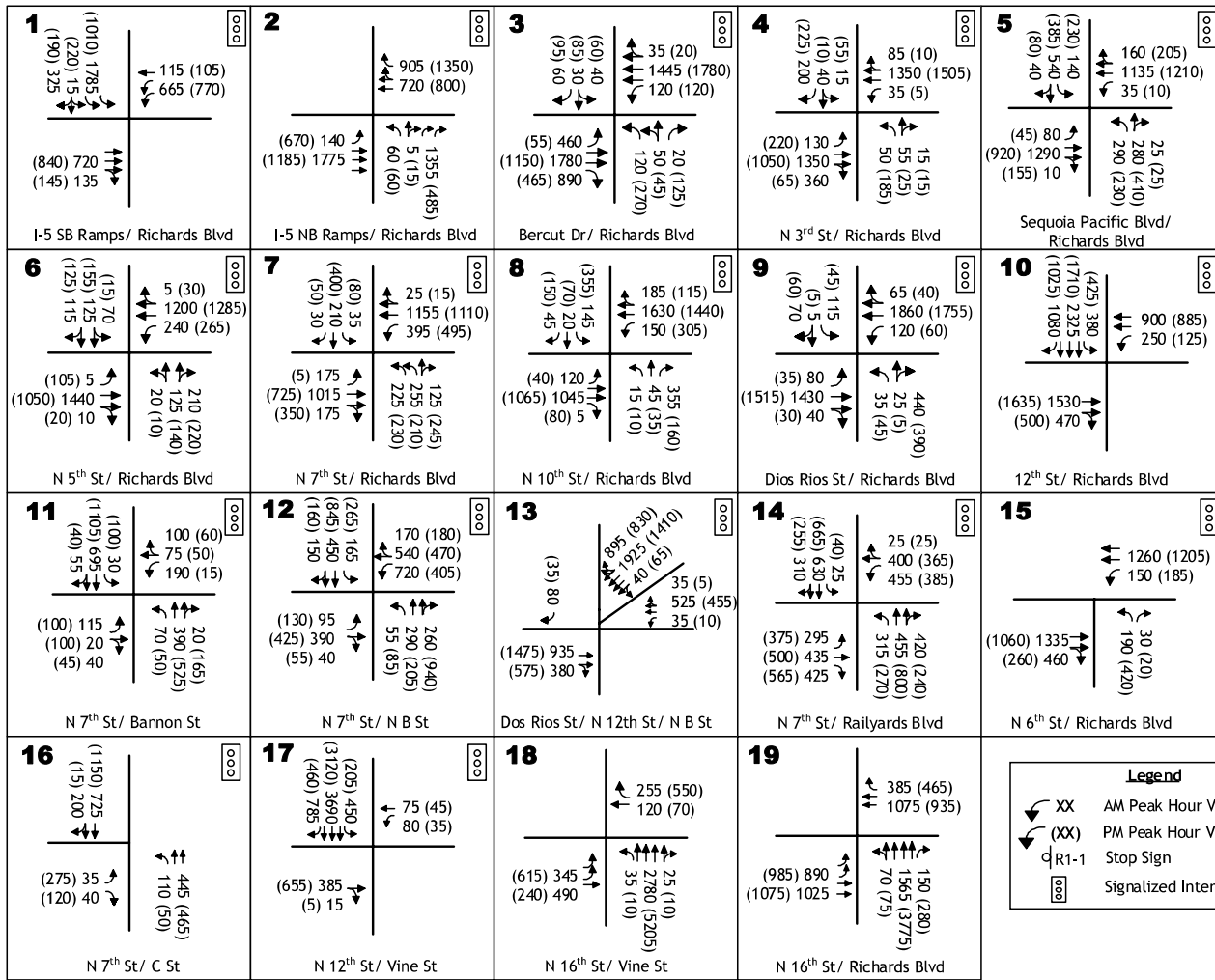
Legend	
	AM Peak Hour Volume
	PM Peak Hour Volume
	Stop Sign
	Signalized Intersection

BASELINE PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

4705-025 RA 7/8/2020

figure 4



Attachment F

Signal Design Concept Report

SIGNAL DESIGN CONCEPT REPORT

RICHARDS BLVD OFFICE COMPLEX

Sacramento, CA



Prepared By:

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DRAFT
November 4, 2020

4705-025

ACCEPTED BY:

Date _____

DAVID EDROSOLAN, P.E., T.E.
CITY TRAFFIC ENGINEER
CITY OF SACRAMENTO

KD Anderson & Associates, Inc.

Transportation Engineers

RICHARDS BLVD OFFICE COMPLEX

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INTRODUCTION

This report provides analysis of proposed new signalized intersections and existing signalized intersections adjacent to the Richards Blvd Office Complex (RBOC) project in the City of Sacramento. The project site is located south of Richards Blvd and west of N. 7th Street. The RBOC proposes signalized vehicle access at three new intersections and will modify two existing signalized intersections in conjunction with proposed frontage improvements on Richards Blvd and on N. 7th Street. The intersection locations are summarized below. Figure 1 displays the subject intersections and the RBOC site.

- N. 7th Street / Bannon Street (new)
- N. 7th Street / C Street (new)
- N. 6th Street / Richards Blvd (new)
- Richards Blvd / N. 7th Street (modification)
- N. 7th Street / N. B Street (modification)

This report is intended to summarize signal design concept elements for improvements to each intersection for review and approval by City staff prior to preparation of construction documents for the traffic signal installations and/or modifications. The report presents traffic volume projections for the intersections, associated operating levels of service, vehicle queue estimates and discussion of pedestrian and bicycle facilities. Also appended to this report is a memorandum prepared by Kimley-Horn which outlines in detail the light rail preemption operations for the two new traffic signals proposed for N. 7th Street.

This report includes and makes use of a traffic operations analysis technical memo (*Traffic Operational Analysis for RBOC DCR's, KD Anderson & Associates*) prepared for and in advance of this Design Concept Report. The analysis provides SimTraffic simulation to evaluate the operation of existing and proposed traffic signals in the area of the RBOC as required by the City of Sacramento to support the Design Concept Report. The operational analysis has been previously reviewed and commented on by City staff. The analysis utilized traffic volume forecasts created for the RBOC EIR and subsequently supplemented for the Department of General Services (DGS) were adjusted to account for the quantity of employment and on-site parking now proposed, as well as the location of site access, parking and drop-off /loading. SimTraffic networks created for the RBOC EIR and subsequent document were then adjusted to account for the current access and internal circulation proposal. Resulting traffic operations expressed in terms of intersection delays and peak vehicle queues were projected and used to evaluate the feasibility of proposed access as well as internal circulation.

RBOC on-site employment is expected to ultimately reach 5,000 persons. The RBOC includes a 1,294 space parking garage with access to C Street between N. 6th Street and N. 7th Street and to N. 6th Street between Richards Blvd and Bannon Street, as well as surface parking for visitors and employees with access to C Street. The RBOC includes designated drop-off and loading areas on Bannon Street as well as a pedestrian crossing linking RBOC's office towers with the parking structure. No direct access to the project's parking areas is planned via Bannon Street.

SETTING

Roads

Richards Blvd is a 4-lane arterial street which extends from I-5 in the west to SR 160 in the east, a distance of approximately 1.5 miles. The majority of the roadway provides a continuous center turn lane. The posted speed limit ranges from 35 - 40 mph.

The project will construct a new N. 6th Street intersection with Richards Blvd located approximately 600' west of N. 7th Street and 400' east of N. 5th Street. The south side of Richards Blvd will be widened and reconstructed between the new N. 6th Street intersection and N. 7th Street. Existing bike lanes will also be enhanced between these intersections and will include 6' wide lanes with a 3' wide bike lane buffer on both the north and south sides of the street.

Richards Blvd will be restriped between the N. 6th and N. 7th Street intersections to eliminate the existing 3rd westbound lane. This lane currently extends west from N. 7th Street and is dropped at the location of the new N. 6th Street alignment. The existing bus pull out will remain in place on the north side of the street. These striping modifications will eliminate the lane drop merge maneuvers, provide width for the bike lane buffer and facilitate traffic signal improvements at the N. 6th Street intersection. The balance of the existing pavement area and pull out will be available for RT busses and passenger drop-off to the light rail station.

A bus stop will be located on the south side of Richards Blvd east of N. 6th Street. This will include a bus pad for loading and unloading of passengers.

N. 7th Street is designated as a collector street south of Richards Blvd to N. B Street and an arterial street south of N. B Street. N. 7th Street extends south from Richards Blvd through the downtown for a distance of approximately 2 miles and terminates at T Street. The posted speed limit is 35 mph. The roadway currently provides two northbound and one southbound travel lane and a continuous center turn lane between Richards Blvd and N. B Street. The 2nd southbound lane is currently striped out to prohibit vehicles and the southbound light rail track alignment also follows this lane. South of N. B Street the roadway is a 2-lane street.

The Sacramento Regional Transit District (RT) operates the Green Line light rail line along N. 7th Street. The Green Line is in-street running from N. B Street to Richards Blvd and terminates at the Township 9 LRT station located at the northwest quadrant of the Richards Blvd / N. 7th Street intersection. The northbound and southbound tracks transition to a single track within the N. 7th Street / N. B Street intersection and continue south on the east side of N. 7th Street adjacent to the northbound vehicle lane.

The RBOC project will construct new Bannon Street and N. C Street intersections with N. 7th Street to serve the project. The Bannon Street intersection will be located 550' south of Richards

Blvd. The N. C Street intersection will be located 400' south of Bannon Street and 300' north of N. B Street. The west side of N. 7th Street will be widened and reconstructed between N. B Street and Richards Blvd. This will include a 2-way cycle track facility to replace the existing southbound Class II bike lane. A 2' wide raised median will separate the cycle track from the southbound vehicle lanes and RT track. The cycle track will provide 5' lanes separated by a 2' wide striped median. Cycle track operations will be controlled by the traffic signals at the Bannon Street and N. C Street intersections.

Alternative Transportation Modes

Transit Service. RT bus and light rail service is provided on Richards Blvd and via the Township 9 LRT station immediately adjacent to the site. A new bus stop will be located on the south side of Richards Blvd immediately east of N. 6th Street.

Pedestrian Facilities. Continuous sidewalks are provided on Richards Blvd and on N. 7th Street in the vicinity of the project site. The RBOC project will widen existing sidewalk facilities adjacent to the site. A 24' sidewalk will be provided on the Richards Blvd frontage and a 16' sidewalk along the N. 7th Street frontage. Expanded pedestrian crossings 15' in width will be provided at the N. 6th Street and N. 7th Street intersections for pedestrian circulation to and from the RBOC site and the Township 9 LRT station.

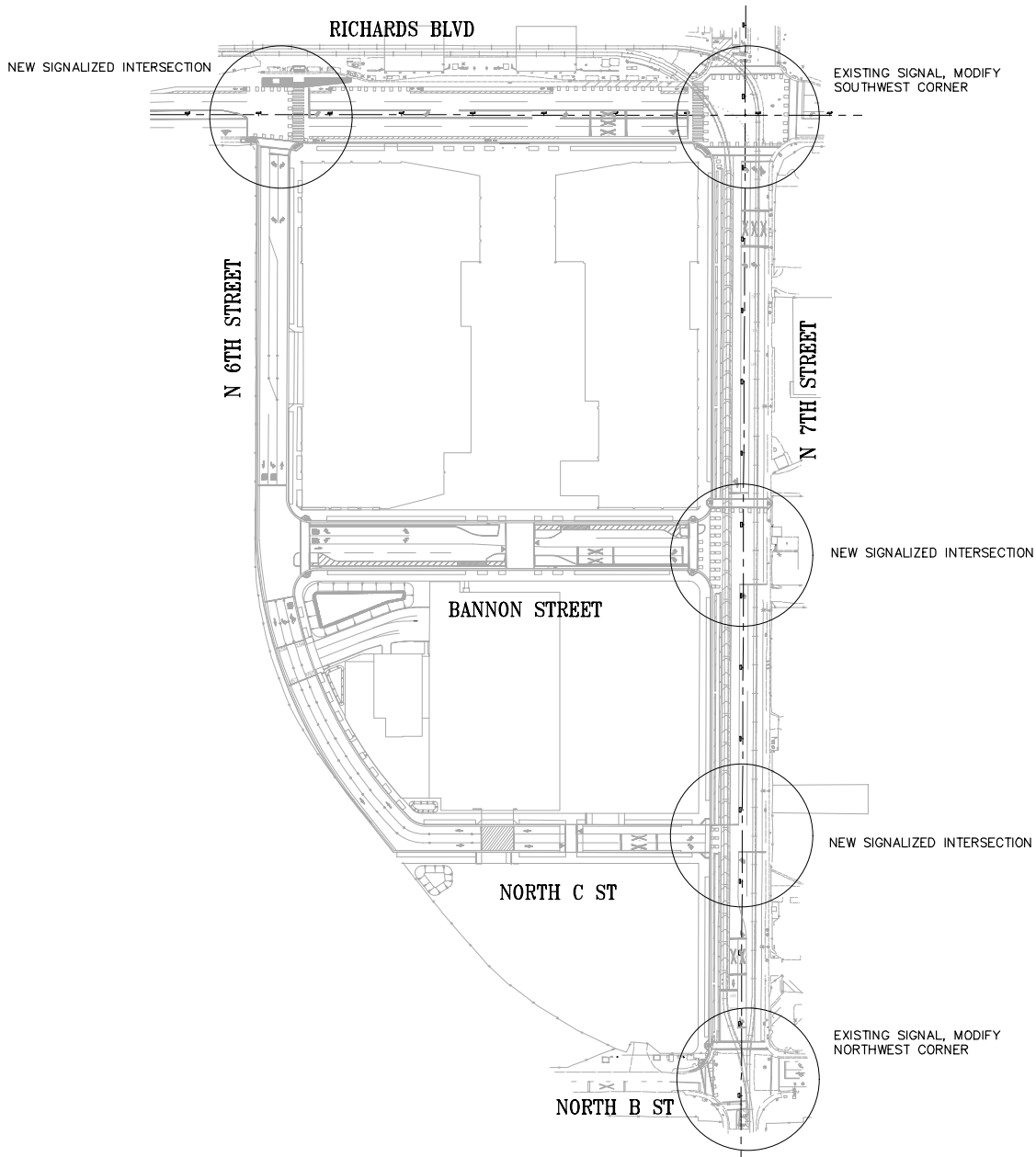
Bicycle Facilities. Class II on-street bike lanes are currently provided on both Richards Blvd and N. 7th Street adjacent to the RBOC site. As previously discussed, the project will construct enhanced bicycle facilities on both streets adjacent to the site. Six foot Class II bike lanes with a 3' wide striped buffer will be provided on Richards Blvd. A 2-way cycle track with 5' lanes and a raised 2' wide island buffer will be provided on the west side of N. 7th Street.

Adjacent Land Uses

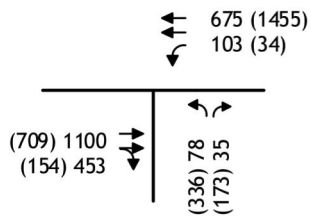
Existing development adjacent to the RBOC project and subject intersections consists of the Township 9 LRT station to the north, industrial uses on the east side of N. 7th Street and industrial uses to the west of the proposed N. 6th Street alignment. Property on N. B Street adjacent to the south side of the RBOC site is undeveloped.

Traffic Volumes

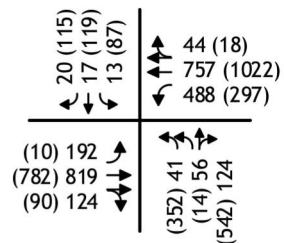
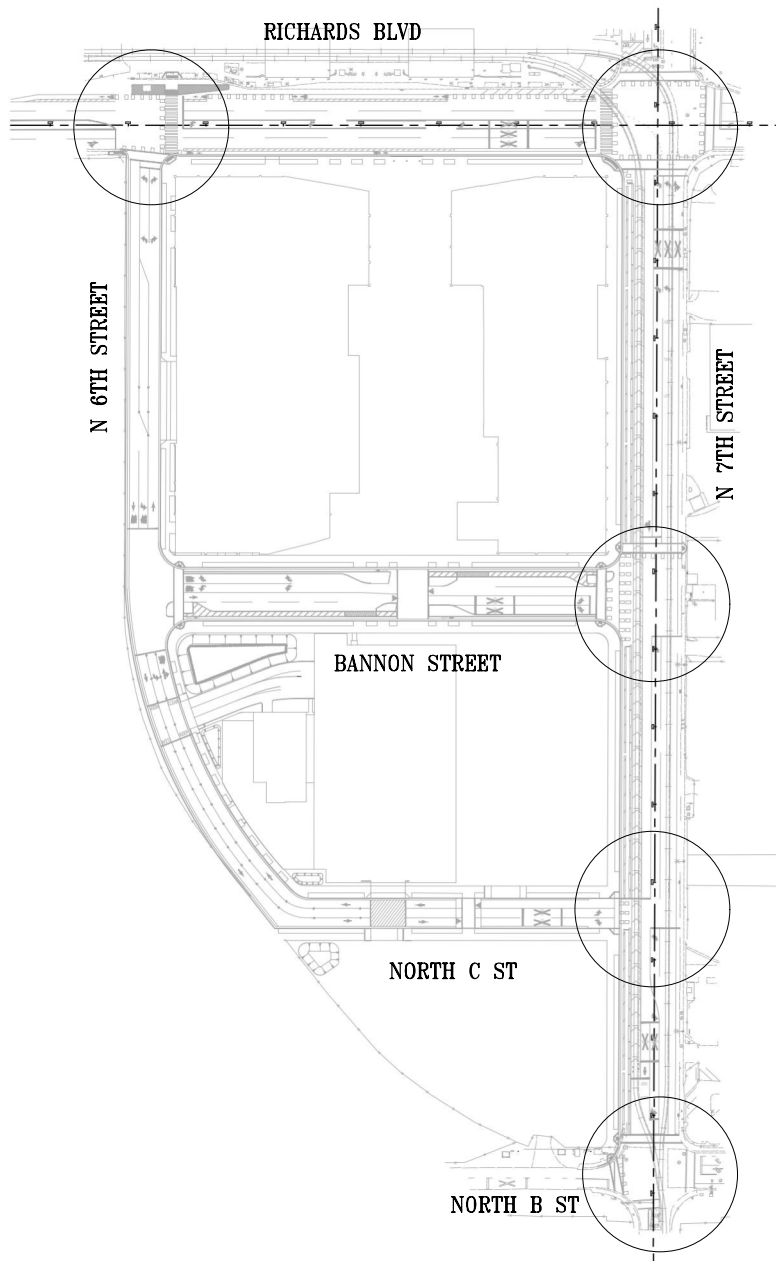
Figures 2 and 3 display baseline plus project and cumulative with project peak hour intersection volumes, respectively. Please refer to the appended operational analysis for additional detail on traffic volume projections. Pedestrian volumes have also been estimated for the primary circulation routes. These consist of Richards Blvd crossings at the N. 6th Street and N. 7th Street intersections to and from the RBOC site and the Township 9 LRT station. Approximately 600 peak hour pedestrians are projected at the N. 6th Street intersection and 900 at the N. 7th Street intersection.



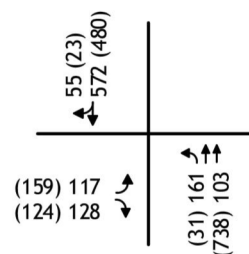
RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL LOCATIONS



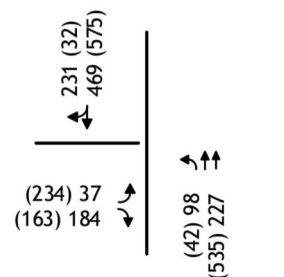
N 6th St/ Richards Blvd



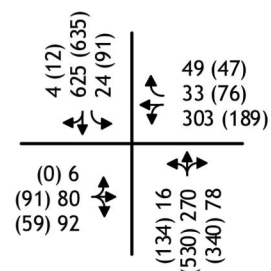
N 7th St/ Richards Blvd



N 7th St/ Bannon St



N 7th St/ C St

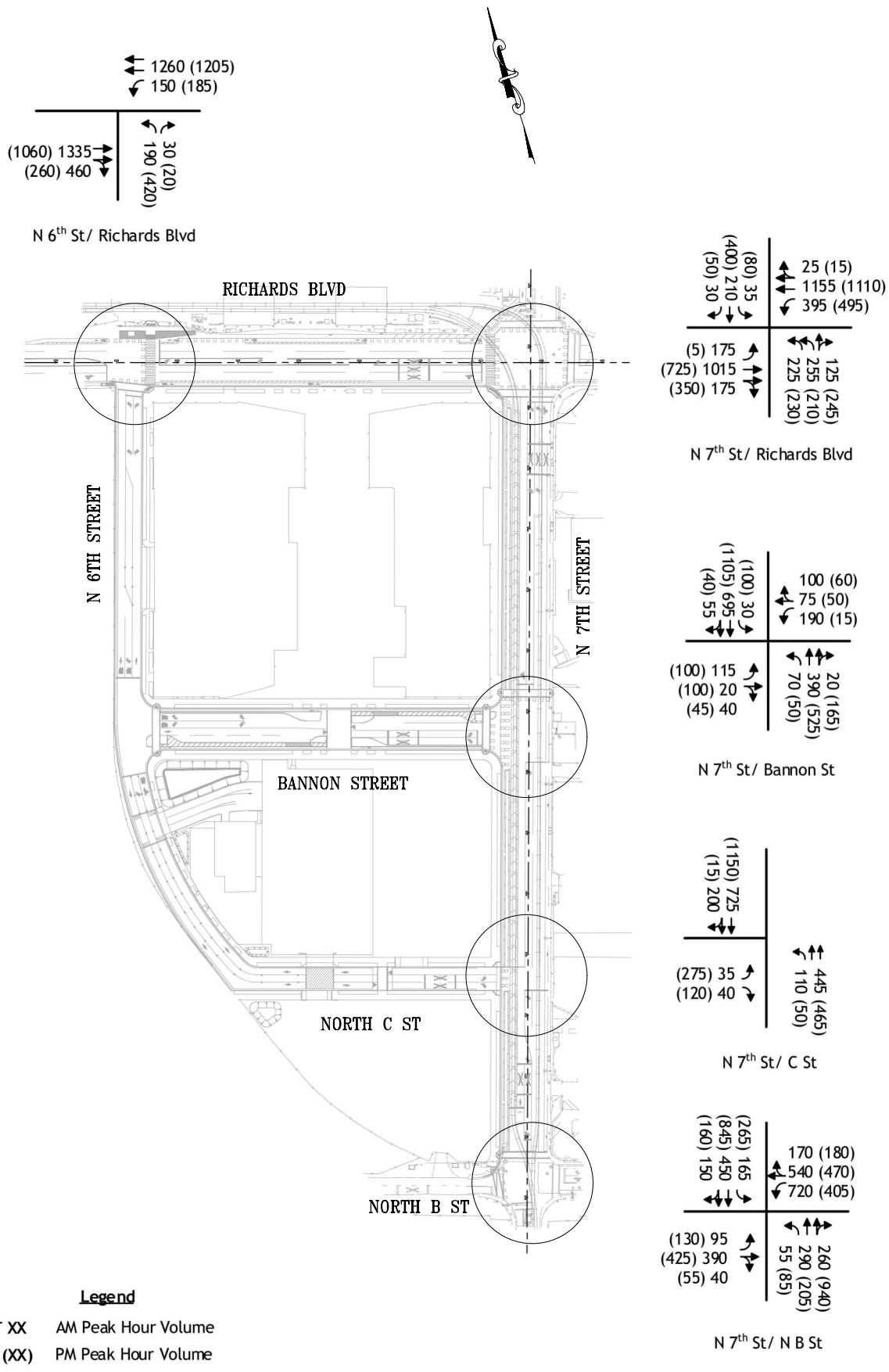


N 7th St/ N B St

Legend

- ↖ XX AM Peak Hour Volume
- ↖ (XX) PM Peak Hour Volume

RICHARDS BLVD OFFICE COMPLEX BASELINE PLUS PROJECT TRAFFIC VOLUMES



RICHARDS BLVD OFFICE COMPLEX
CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES

Figure 3

RICHARDS BLVD / N. 7TH STREET INTERSECTION

PROJECTED INTERSECTION OPERATIONS

Intersection Levels of Service

Projected intersection operations are summarized in Tables 1 and 2 for baseline plus project and cumulative with project conditions, respectively. As shown in Tables 1, level of service (LOS) E is projected in both the a.m. and p.m. peak hours under baseline plus project conditions. This is within acceptable operating standards identified for the intersection. Under long term cumulative conditions, p.m. peak hour intersection operations are projected at LOS F, exceeding identified standards.

TABLE 1 BASELINE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / Richards Blvd	A – E	E	55	E	71

TABLE 2 CUMULATIVE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / Richards Blvd	A – E	D	54	F	148

Vehicle Queues

Tables 3 and 4 summarize projected vehicle queues at the intersection. As shown, projected vehicle queues can be accommodated within the turn pocket lengths with the exception of the existing southbound left and right turn lanes under both background and cumulative plus project conditions.

TABLE 3 BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / Richards Blvd</i>							
• Eastbound left	170 ¹	192	180	275	10	30	130
• Northbound left	620 ²	41	<25	45	352	110	190
• Southbound left	140	13	<25	40	87	110	205
• SB right	110	20	<25	55	77	125	200
• Westbound left	190 ³	488	350	650	297	335	555

TABLE 4 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / Richards Blvd</i>							
• Eastbound left	170 ¹	175	165	265	5	<25	60
• Northbound left	620 ²	225	90	155	230	235	515
• Southbound left	140	35	40	135	80	80	215
• SB right	110	30	45	135	50	40	135
• Westbound left	190 ³	395	235	395	495	715	955

SIGNAL DESIGN SUMMARY

Exhibits TS-1 and TS-2 display the traffic signal modifications proposed for the Richards Blvd / N. 7th Street intersection. The attached Striping Plan exhibit displays intersection geometrics, bicycle facilities, pedestrian crosswalk striping and lane dimensions. The majority of the existing signal equipment at the intersection will remain in place. No change to existing signal phasing is proposed. Equipment at the southwest corner will be replaced to accommodate project frontage improvements. It is proposed to reuse the existing video detection camera and emergency vehicle detector at the southwest corner. Eastbound advance detector loops will be replaced and located for a 35 mph design speed.

Truck Turn Paths

Design vehicle turning movement paths are displayed on the attached exhibit. An eastbound right turn movement from Richards Blvd to N. 7th Street is displayed around the proposed southwest corner which will be reconstructed. As shown, a WB-50 design vehicle can satisfactorily negotiate this turn.

Pedestrian Crossing Locations

Crosswalks and pedestrian equipment currently provided across all legs of the intersection. The west side crosswalk will be expanded to 15' in width and striped with continental solid bars for higher visibility.

Bicycle Movements

Colored bicycle markings are proposed across all legs of the intersection on the inside of the pedestrian crosswalk markings to direct bicycle turning traffic to utilize the pedestrian signals. The northbound cycle track lane will terminate at the south side of the intersection. Colored bicycle markings are also proposed to direct bikes to the southwest corner of the intersection and utilize pedestrian signals to continue across the intersection. Additional signing and pavement markings are also proposed to indicate that the cycle track lane is ending at the intersection. This is displayed on exhibit TS-1.

N. 7TH STREET / N. B STREET INTERSECTION

PROJECTED INTERSECTION OPERATIONS

Intersection Levels of Service

Projected intersection operations are summarized in Tables 5 and 6 for baseline plus project and cumulative with project conditions, respectively. As shown in Tables 6, LOS F and E are projected in the a.m. and p.m. peak hours under baseline plus project conditions. Under long term cumulative conditions, LOS F is projected during both the morning and afternoon peak hours.

TABLE 5 BASELINE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / N. B Street	A – E	F	98	E	67

TABLE 6 CUMULATIVE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / N. B Street	A – E	F	83	F	119

Vehicle Queues

Tables 7 and 8 summarize projected vehicle queues at the intersection. As shown, projected left turn queues can generally be accommodated within the turn pocket lengths under both background and cumulative plus project conditions. The southbound left turn pocket on N. 7th Street is projected to be slightly exceeded (5') under cumulative p.m. peak hour conditions.

TABLE 7 BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / B Street</i>							
• Southbound left	125 ¹	24	<25	65	91	40	125
• WB right turn	1,100	49	145	585	47	25	50

TABLE 8 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / B Street</i>							
• Southbound left	125 ¹	165	115	150	265	120	130
• WB left	1,100	720	465	725	405	460	820

SIGNAL DESIGN SUMMARY

Exhibit TS-3 displays the traffic signal modifications proposed for the N. 7th Street / N. B Street intersection. The attached Striping Plan exhibit displays intersection geometrics, bicycle facilities, pedestrian crosswalk striping and lane dimensions. The majority of the existing signal equipment at the intersection will remain in place. No change to existing signal phasing is proposed. The 1-B pole and PBA post at the northwest corner will be replaced to accommodate

project frontage improvements. The existing mast arm pole and equipment can remain in place on this corner. Two pull boxes will need to be relocated behind the new curb line.

Pedestrian Crossing Locations

Crosswalks and pedestrian equipment is currently provided across all legs of the intersection.

Bicycle Movements

Pedestrians and bicycles currently share the sidewalk on the west side of N. 7th Street south of N. B Street. Colored bike markings are proposed for the west side of the intersection to direct northbound bicyclists to the beginning of the cycle track at the northwest corner of the intersection.

N. 7TH STREET / BANNON STREET INTERSECTION

PROJECTED INTERSECTION OPERATIONS

Intersection Levels of Service

Projected intersection operations are summarized in Tables 9 and 10 for baseline plus project and cumulative with project conditions, respectively. As shown, satisfactory LOS C or better is projected in both the a.m. and p.m. peak hours under both baseline and cumulative plus project conditions. This is within acceptable operating standards identified for the intersection.

TABLE 9 BASELINE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / Bannon Street	A – E	C	21	C	21

TABLE 10 CUMULATIVE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / Bannon Street	A – E	B	17	C	24

Vehicle Queues

Tables 11 and 12 summarize projected vehicle queues at the intersection. As shown, projected northbound left turn vehicle queues can be accommodated within the turn pocket length and center lane area. Eastbound queues on Bannon Street are projected to extend past the mid-block pedestrian crosswalk.

TABLE 11 BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / Bannon Street</i>							
• Northbound left	120 ¹	161	90	170	31	<25	75
• Eastbound left	205 ²	117	85	134	159	195	340
• Eastbound right	205	128	175	320	124	110	260

TABLE 12 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
N. 7 th St / Bannon Street							
• Northbound left	120 ¹	70	45	95	50	50	120
• Eastbound left	205 ²	115	150	250	100	155	270
• EB thru+right	205	145	45	115	145	150	295

SIGNAL DESIGN SUMMARY

Exhibit TS-4 displays the proposed traffic signal design for the Bannon Street / N. 7th Street intersection. The attached Striping Plan exhibit displays intersection geometrics, bicycle facilities, pedestrian crosswalk striping and lane dimensions. Typical Tee intersection phasing is proposed with a protected northbound left turn phase on N. 7th Street. The north side pedestrian crossing phase is proposed to operate with the northbound left turn phase. The northbound contra-flow cycle track movement will be operated with the phase 4 vehicle phase and bicycle head indications will be provided for this movement. Proposed light rail pre-emption is indicated on the plan sheet for both inbound and outbound train traffic. Pre-emption will be accompanied by activated regulatory and warning signs as displayed on the plan. LRT train signal indications will also be provided.

It is proposed to prohibit right turns on red from Bannon Street during the N. 7th Street phase 4 green. This is for bicycle safety. It is unlikely that a motorist turning right from Bannon Street would anticipate a northbound bike and a northbound bike may also not be readily visible from the eastbound right turn lane.

The light rail overhead contact system (OCS) will require non-standard poles for mast arms to clear the messenger wires. Exhibit TS-7 displays the equipment dimensions needed for poles on each side of N. 7th Street. This considers the existing lines on the east side of N. 7th Street as well as new OCS pole locations on the west side.

Truck Turn Paths

WB-50 design vehicle turning movement paths are displayed on the two attached Bannon Street exhibits. Left and right turns into and out of Bannon Street are presented. As shown, a WB-50 design vehicle can satisfactorily negotiate these turns.

Pedestrian Crossing Locations

Crosswalks and associated pedestrian equipment are proposed across Bannon Street and on the north side of the intersection across N. 7th Street. A crossing is not proposed at this time on the south side of the intersection due to an existing driveway on the east side of N. 7th Street. The driveway location does not permit an acceptable crosswalk alignment. A future extension of Bannon Street to the east will permit installation of an additional crossing on the south side of the intersection.

Bicycle Movements

Colored bicycle markings are proposed across the west and north legs of the intersection on the inside of the pedestrian crosswalk markings to direct outbound Bannon Street bicycle turning traffic to utilize the pedestrian signals or enter the cycle track. Colored markings will also delineate the cycle track through the intersection. No exclusive bicycle phases are proposed for the intersection.

Traffic Signal Equipment

Placement of the controller and service cabinets is shown at the southwest corner of the intersection located at the rear of the 16' wide sidewalk. It is anticipated that electrical service can be provided in this area and the location of the controller cabinet on this corner will facilitate installation of signal interconnect conduit.

Fiber optic signal interconnect as well as LRT pre-emption cables will be installed on N. 7th Street and will connect to existing conduit facilities on the east side of the roadway.

Other equipment will include standard City of Sacramento signal design features such as emergency vehicle pre-emption (GPS based), CCTV PTZ camera installation, modems, video stop bar detection and advance detection on N. 7th Street. Equipment details are displayed on exhibits TS-8 through TS-10. Advance detection placement on N. 7th Street is shown at 200 feet and is based upon a 35 mph design speed. Video or radar equipment is proposed for the advance detection in place of City standard loops due to the existence of the in-street light rail tracks.

Existing Driveways

An existing driveway is located on the east side of N. 7th Street immediately adjacent to the intersection. The driveway is located out of the intersection just south of the proposed northbound stop bar. It is proposed to limit turning movements at this driveway to right turns via signing. Turn prohibition signage will be placed at the back of walk as well as on the signal mast serving southbound N. 7th Street.

N. 7TH STREET / N. C STREET INTERSECTION

PROJECTED INTERSECTION OPERATIONS

Intersection Levels of Service

Projected intersection operations are summarized in Tables 13 and 14 for baseline plus project and cumulative with project conditions, respectively. As shown, satisfactory LOS C is projected in both the a.m. and p.m. peak hours under both baseline and cumulative plus project conditions. This is within acceptable operating standards identified for the intersection.

TABLE 13 BASELINE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / C Street	A – E	C	21	C	26

TABLE 14 CUMULATIVE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 7 th Street / C Street	A – E	C	19	C	30

Vehicle Queues

Tables 15 and 16 summarize projected vehicle queues at the intersection. As shown, projected northbound left turn vehicle queues are projected to exceed the length of the turn pocket and would extend into the number 1 northbound lane. Eastbound queues on N. C Street are projected to extend past the parking garage entrance.

TABLE 15 BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / C Street</i>							
• Northbound left	60 ¹	98	65	120	42	<25	40
• Eastbound left	250 ²	37	45	125	234	175	325
• Eastbound right	250	184	200	405	163	195	335

TABLE 16 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 7th St / C Street</i>							
• Northbound left	60 ¹	110	80	130	50	40	100
• Eastbound left	250 ²	35	45	120	275	155	270
• Eastbound right	250	40	55	225	120	150	295

SIGNAL DESIGN SUMMARY

Exhibit TS-5 displays the proposed traffic signal design for the N. C Street / N. 7th Street intersection. The attached Striping Plan exhibit displays intersection geometrics, bicycle facilities, pedestrian crosswalk striping and lane dimensions. Typical Tee intersection phasing is proposed with a protected northbound left turn phase on N. 7th Street. The northbound contra-flow cycle track movement will be operated with the phase 4 vehicle phase and bicycle head indications will be provided for this movement. Proposed light rail pre-emption is indicated on the plan sheet for both inbound and outbound train traffic. Pre-emption will be accompanied by activated regulatory and warning signs as displayed on the plan. LRT train signal indications will also be provided.

It is proposed to prohibit right turns on red from N. C Street during the N. 7th Street phase 4 green. This is for bicycle safety. It is unlikely that a motorist turning right from N. C Street would anticipate a northbound bike and a northbound bike may also not be readily visible from the eastbound right turn lane.

The light rail overhead contact system (OCS) will require non-standard poles for mast arms to clear the messenger wires. Exhibit TS-7 displays the equipment dimensions needed for poles on each side of N. 7th Street. This considers the existing lines on the east side of N. 7th Street as well as new OCS pole locations on the west side.

Truck Turn Paths

Fire truck design vehicle turning movement paths are displayed on the attached N. C Street exhibit. Right turns in and out of N. C Street are presented. As shown, a fire truck design vehicle can satisfactorily negotiate these turns.

Pedestrian Crossing Locations

A crosswalk and associated pedestrian equipment is proposed across N. C Street. No pedestrian facilities are proposed for crossing N. 7th Street at this intersection. N. C Street will be a private drive and will primarily provide vehicle access to the on site parking garage and service lot. Pedestrian activity from this area to the east side of N. 7th Street is not expected. The existing N. 7th Street crossing at N. B Street is located 275' to the south.

Bicycle Movements

No bicycle facilities are proposed for N. C Street. Colored bike markings will delineate the cycle track through the intersection. No exclusive bicycle phases are proposed for the intersection.

Traffic Signal Equipment

Placement of the controller and service cabinets is shown at the southwest corner of the intersection located at the rear of the 16' wide sidewalk. It is anticipated that electrical service can be provided in this area and the location of the controller cabinet on this corner will facilitate installation of signal interconnect conduit.

Fiber optic signal interconnect as well as LRT pre-emption cables will be installed on N. 7th Street and will connect to existing conduit facilities on the east side of the roadway.

Other equipment will include standard City of Sacramento signal design features such as emergency vehicle pre-emption (GPS based), CCTV PTZ camera installation, modems, video stop bar detection and advance detection on N. 7th Street. Equipment details are displayed on exhibits TS-8 through TS-10. Advance detection placement on N. 7th Street is shown at 200 feet and is based upon a 35 mph design speed. Video or radar equipment is proposed for the advance detection in place of City standard loops due to the existence of the in-street light rail tracks.

Existing Driveways

An existing driveway is located on the east side of N. 7th Street and approximately half of the 32' wide driveway will extend into the intersection past the northbound stop bar. This driveway is currently gated and not in use. Property served by this driveway is owned by the City and this property is also served by other driveways. It is proposed to coordinate with the City for the removal of this driveway cut. The driveway cut would be removed in conjunction with construction of the signal system.

RICHARDS Blvd / N. 6th STREET INTERSECTION

PROJECTED INTERSECTION OPERATIONS

Intersection Levels of Service

Projected intersection operations are summarized in Tables 17 and 18 for baseline plus project and cumulative with project conditions, respectively. As shown, satisfactory LOS C to D is projected in both the a.m. and p.m. peak hours under both baseline and cumulative plus project conditions. This is within acceptable operating standards identified for the intersection.

TABLE 17 BASELINE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 6 th Street / Richards Blvd	A – E	D	40	C	29

TABLE 18 CUMULATIVE PLUS RBOC LEVELS OF SERVICE					
Intersection	Acceptable LOS	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
N. 6 th Street / Richards Blvd	A – E	C	21	D	43

Vehicle Queues

Tables 19 and 20 summarize projected vehicle queues at the intersection. As shown, projected westbound left turn vehicle queues on Richards Blvd can be accommodated within the turn pocket length and center lane area. Northbound queues on N. 6th Street can also be accommodated prior to reaching the Bannon Street intersection.

TABLE 19 BASELINE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 6th St / Richards Blvd</i>							
• Westbound left	160 ¹	103	70	130	34	40	135
• Northbound left	440 ²	78	35	70	336	110	140
• Northbound right	440	35	<25	40	173	140	305

TABLE 20 CUMULATIVE PLUS RBOC AM/PM PEAK HOUR 95 TH PERCENTILE QUEUES							
Intersection	AM Peak Hour				PM Peak Hour		
	Storage (feet)	Volume (vph)	Queue length (feet)		Volume (vph)	Queue length (feet)	
			Average	95 th %		Average	95 th %
<i>N. 6th St / Richards Blvd</i>							
• Westbound left	160 ¹	150	115	225	185	105	200
• Northbound left	440 ²	190	95	140	420	270	440
• Northbound right	440	30	35	105	20	<25	65

SIGNAL DESIGN SUMMARY

Exhibit TS-6 displays the proposed traffic signal design for the Richards Blvd / N. 6th Street intersection. The attached Striping Plan exhibit displays intersection geometrics, bicycle facilities, pedestrian crosswalk striping and lane dimensions. Typical Tee intersection phasing is proposed with a protected westbound left turn phase on Richards Blvd. Pedestrian phases are proposed across the east side and south side of the intersection.

Raised islands are proposed on the north side of the intersection to fill in the existing passenger drop off area to the LRT station. This drop off area cannot be maintained within the signalized intersection limits. Passenger drop off will be accommodated to the east of the intersection between N. 6th and N. 7th Streets. The raised islands will also provide transition from the existing north side curb line for westbound traffic, will accommodate traffic signal equipment and will reduce the length of the Richards Blvd pedestrian crossing. The crosswalk length will be reduced from approximately 97' to 75' relative to the existing north side curb location.

Truck Turn Paths

WB-50 design vehicle turning movement paths are displayed on the three attached N. 6th Street exhibits. Left and right turns into and out of N. 6th Street are presented. As shown, a WB-50 design vehicle can satisfactorily negotiate a westbound left turn from Richards Blvd and a northbound right turn from N. 6th Street. Eastbound right turns from Richards Blvd cannot be accommodated without utilizing the full width of N. 6th Street. The southwest corner of the intersection will be improved for ADA access within the existing right of way, but this will not permit construction of a curb return to accommodate a WB-50 turn. Future widening of the west side of N. 6th Street will mitigate this condition.

In the interim, the project proposes coordinated operation of truck deliveries. Any truck deliveries will generally be within the early morning off-peak hours and these arrivals will be coordinated with the on-site loading dock. It is proposed that northbound N. 6th Street will be coned off for a short period of time to accommodate a truck arrival from eastbound Richards Blvd. The limits of this temporary turn area are displayed on the turn exhibit.

Pedestrian Crossing Locations

Crosswalks and associated pedestrian equipment are proposed across N. 6th Street and on the east side of the intersection across Richards Blvd. A crossing is not proposed on the west side of the intersection. The majority of all pedestrian crossings of Richards Blvd will be oriented to the southwest corner of the intersection from the RBOC site to the light rail station. An expanded crossing 15' in width is proposed and will include continental bar markings for increased visibility. A west side crossing is not proposed, as RT has requested a parking area for maintenance vehicles on the north side of Richards Blvd to occasionally access the track equipment house on the north side of the light rail lines. Maintenance vehicles currently utilize the existing pull out area. The existing pavement area immediately west of the proposed raised island is intended for this maintenance vehicle parking and this would conflict with a pedestrian crossing on the west side of the intersection.

Bicycle Movements

Colored bicycle markings are proposed across the east and south legs of the intersection on the inside of the pedestrian crosswalk markings to direct bicycle traffic through the intersection. No bicycle facilities are proposed for N. 6th Street. Video detection will be provided for the bike lane approaches on Richards Blvd.

Traffic Signal Equipment

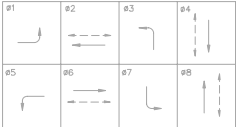
Placement of the controller and service cabinets is shown on the north side of the intersection with the new raised island area. It is anticipated that electrical service can be provided in this area and the location of the controller cabinet on this side will facilitate installation of signal interconnect conduit. The adjacent maintenance vehicle parking area proposed for RT vehicles can then also be utilized by City signal maintenance vehicles.

Fiber optic signal interconnect cables will be installed on Richards Blvd and will connect to existing conduit facilities on the north side of the roadway.

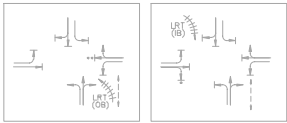
Other equipment will include standard City of Sacramento signal design features such as emergency vehicle pre-emption (GPS based), CCTV PTZ camera installation, modems, video stop bar detection and advance detector loops on Richards Blvd. Equipment details are displayed on exhibits TS-8 through TS-10. Advance detection placement on Richards Blvd is shown at 200 feet and is based upon a 35 mph design speed.

POLE AND EQUIPMENT SCHEDULE													
LOCATION	STANDARD	#	VEH. SIGNALS	PED. SIGNALS	P.P.B.	MAST ARM LENGTH	LUM.	WATT.	NOTES				
			TYPE	SEC.	MTG.	#	TYPE	MTG.	#	ARROW	TRAFFIC	STLT.	
(A)	29-5-100 EX	2	1WOL	12"	12"	1WOL	SP-1-T	4	LEFT				
(B)	1-B EX	2	1WOL	12"	12"	1WOL	SP-1-T	4	LEFT				
(C)	1-B EX	3	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(D)	1-B EX	4	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(E)	60-4-100 EX	2	1WOL	12"	12"	1WOL	SP-1-T	2	LEFT				
(F)	15 EX	8	1WOL	12"	12"	1WOL	SP-1-T	2	LEFT				
(G)	1-B EX	2	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(H)	25-4-100 EX	6	1WOL	12"	12"	1WOL	SP-1-T	2	LEFT				
(I)	1-B EX	2	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(J)	25-4-100 EX	7	1WOL	12"	12"	1WOL	SP-1-T	2	LEFT				
(K)	1-B EX	4	1WOL	12"	12"	1WOL	SP-1-T	2	LEFT				
(L)	1-B EX	5	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(M)	1-B EX	7	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(N)	MODIFIED 29-5-100 NEW	4	1WOL	12"	12"	1WOL	SP-1-T	2	LEFT				
(P)	1-B(7) NEW	1	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				
(R)	15TS NEW	1	1WOL	12"	12"	1WOL	SP-1-T	2	RIGHT				

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL NEW EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE ECI eLine Star SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 700 (TYPE 3 DISTRIBUTION).



EXISTING PHASE DIAGRAM

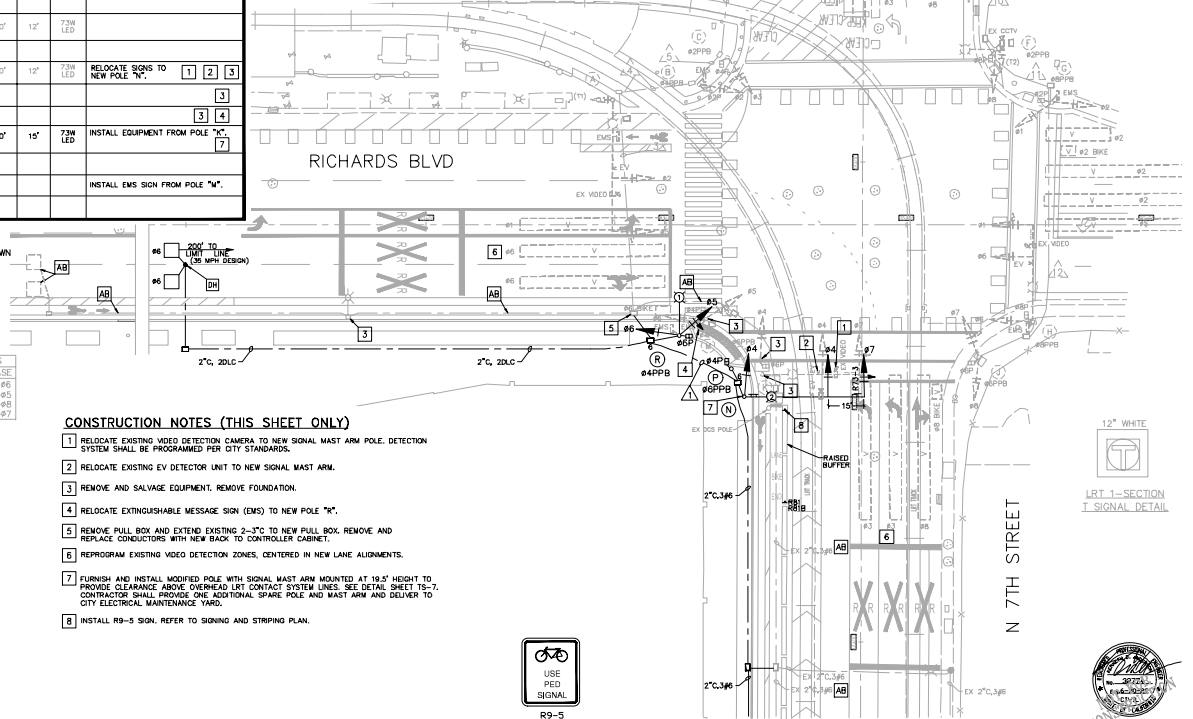
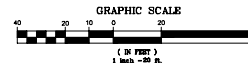


- EXISTING LRT PROPRIETARY PRE-EMPTION
- (T1) = LRT IB TRAIN SIGNAL
 (T2) = LRT OB TRAIN SIGNAL
 LRT (IB) = LRT INBOUND TO DOWNTOWN
 LRT (OB) = LRT OUTBOUND FROM DOWNTOWN
 * = BOTH NO RIGHT TURN AND TRAIN SYMBOL
 EMS INDICATION ON
 ** = ONLY TRAIN SYMBOL EMS INDICATION ON

THIS PLAN ACCURATE FOR ELECTRICAL WORK ONLY

LUMINAIRE SCHEDULE:				
EXISTING SERVICE No. 2288 IS LOCATED AT THE NORTHWEST CORNER OF RICHARDS BLVD / N 7TH ST.				
CIRCUIT NUMBER	EX 73W LED	EX 73W LED	NEW 73W LED	
	INTX. MAST ARM	MAST ARM TO BE REMOVED	MAST ARM	
1	2	1	1	
2	2			
TOTAL	4	1	1	

- CONNECT LUMINAIRES TO 120V CIRCUITS.
- SERVICE IS 120/240V, 14, 3 WIRE.



CONSTRUCTION NOTES (THIS SHEET ONLY)

1. RELOCATE EXISTING VIDEO DETECTION CAMERA TO NEW SIGNAL MAST ARM POLE. DETECTION SYSTEM SHALL BE PROGRAMMED FOR CITY STANDARDS.
2. RELOCATE EXISTING EV DETECTOR UNIT TO NEW SIGNAL MAST ARM.
3. REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
4. RELOCATE EXTINGUISHABLE MESSAGE SIGN (EMS) TO NEW POLE "R".
5. REMOVE PULL BOX AND EXTEND EXISTING 2-3" TO NEW PULL BOX. REMOVE AND REPLACE CONDUCTORS WITH NEW BACK TO CONTROLLER CABINET.
6. REPROGRAM EXISTING VIDEO DETECTION ZONES, CENTERED IN NEW LANE ALIGNMENTS.
7. FURNISH AND INSTALL MODIFIED POLE WITH SIGNAL MAST ARM MOUNTED AT 19.5' HEIGHT TO PROVIDE CLEARANCE ABOVE OVERHEAD LRT CONTACT SYSTEM LINES. SEE DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.
8. INSTALL R9-5 SIGN. REFER TO SIGNING AND STRIPING PLAN.



REVISIONS				BENCH MARK		FIELD BOOK		CITY OF SACRAMENTO				OFF-SITE IMPROVEMENT PLANS FOR				K&S Anderson		SHEET				
NO.		DESCRIPTION		DATE		BY		DESCRIPTION		ELEV. 724.88 (DAV080)		DEPARTMENT OF PUBLIC WORKS				Transportation Engineers				TS-1		
																3853 Taylor Road, Suite G					10	
																Loomis, California 95650						

DCR		SHEET TS-2 —OF— 10
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- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL NEW EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.

EXISTING PHASE DIAGRAM

EXISTING LRT PROPRIETARY PRE-EMPTION

(T1) = LRT IB TRAIN SIGNAL
(T2) = LRT OB TRAIN SIGNAL
LRT (IB) = LRT INBOUND TO DOWNTOWN
LRT (OB) = LRT OUTBOUND FROM DOWNTOWN
* = EMS INDICATION ON

NOTE: SWITCH TO ALL RED PHASE AND ACTIVATE EMS WHEN LRT VEHICLE APPROACHES THE INTERSECTION. AS SOON AS LRT VEHICLE OCCUPIES THE INTERSECTION, SWITCH TO LRT PRE-EMPTION PHASE.

LUMINAIRE SCHEDULE:

EXISTING SERVICE No. 1533 IS LOCATED ON THE WEST SIDE OF NORTH 7th ST 180' NORTH OF NORTH R ST.

CIRCUIT NUMBER	EXISTING LED INTX. MAST ARM	EX. ROADWAY MAST ARM	
1	2	3	
2	2	3	
TOTAL	4	6	



LRT 1-SECTION
T SIGNAL DETAIL

CONSTRUCTION NOTES (THIS SHEET ONLY)

- 1 REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- 2 RELOCATE PBA TO NEW FOUNDATION.
- 3 REMOVE EXISTING PULL BOX. INSTALL NEW PULL BOX BEHIND NEW CURB. EXTEND EXISTING CONDUITS AND CONDUCTORS TO NEW PULL BOX.
- 4 RELOCATE EXISTING SIGNAL SERVICE CABINET TO NEW FOUNDATION. EXTEND EXISTING 2" CABLE SERVICE CONDUIT TO NEW FOUNDATION. COORDINATE WITH SMUG.
- 5 REMOVE EXISTING PULL BOX. INSTALL NEW PULL BOX BEHIND NEW CURB. EXTEND EXISTING CONDUITS TO NEW PULL BOX. PULL BACK FIBER OPTIC AND PRE-EMPT CABLES AND RENTALL. REPLACE CABLES IF SUFFICIENT SIGNAL IS NOT AVAILABLE TO REUSE.



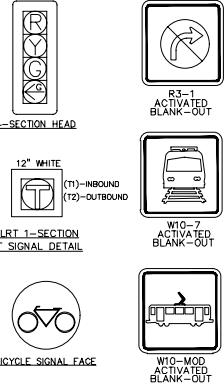
ORIGINAL SCALE IS IN INCHES



SHEET
S-3
OF
10

POLE AND EQUIPMENT SCHEDULE											
LOCATION	STANDARD	VEH. SIGNALS	PED. SIGNALS	P.P.B.	MAST ARM LENGTH	LUM.	NOTES				
		# TYPE SEC. MTS.	# TYPE MTS.	# ARROW TRAFFIC ST. LT.							
(A)	28-4-100	4 1WOL 12" SV-1-T	4 1WOL SP-1-T	4 RIGHT	12'	73W LED	CAP SMA MOUNTING PLATE.				[12]
(B)	1-8	3 4 1WOL 12" TV-3-T	2 1WOL SP-1-T	2 LEFT			INSTALL T SIGNAL ON POLE.				[12]
(C)	(MODIFIED)	3 1WOL 12" SV-2-T	4 1WOL SP-1-T		40'	12' 73W LED	INSTALL D3 SIGN "Bannon St" AND R73-3(CA) SIGN.				[3] [13] [15]
(D)	1-8C	3 4 1WOL 12" TV-3-T	2 1WOL SP-1-T	2 LEFT							
(E)	23-4-100	6 6 1WOL 12" MAS-4B SV-2-T			35'		INSTALL D3 SIGN "N 7th St" AND R61-19 SIGN. INSTALL T SIGNAL ON POLE. INSTALL R9-3 SIGN ON POLE.				[3] [14] [16]
(F)	(MODIFIED)	4 1WOL 12" MAS-4B SV-2-T	4 1WOL SP-1-T		50'	15' 73W LED	INSTALL D3 SIGN "Bannon St" AND R73-3(CA) SIGN. INSTALL R9-3 SIGN ON POLE.				[3] [6] [10] [13] [14] [15]
(G)	1-8	6 1WOL 12" TV-1-T		4 RIGHT							[14]

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE ECI eLite Star SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 700 (TYPE 3 DISTRIBUTION).



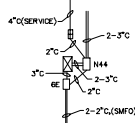
LUMINAIRE SCHEDULE:

NEW METERED SERVICE NO. _____ IS LOCATED AT THE SOUTHWEST CORNER OF N 7TH ST / BANNON ST.

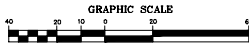
CIRCUIT NUMBER	NEW 73W LED MAST ARM
1	2
2	1
TOTAL	3

- CONNECT LUMINAIRES TO 120V CIRCUITS.
- NEW SERVICE IS 120/240V, 1A, 3 WIRE.

BANNON STREET



CONTROLLER PAD CONDUIT DETAIL



GRAPHIC SCALE

THIS PLAN ACCURATE FOR ELECTRICAL WORK ONLY

CITY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS

REVISIONS

NO.	DESCRIPTION	DATE	BY

BENCH MARK

DESCRIPTION	ELEV. (FATHOMS)

FIELD BOOK

DESCRIPTION	SCALE

DESIGN BY: M. BUCKER

FILED	DATE

CHECKED BY: J. ANDERSON

R.G.E.	DATE

OFF-SITE IMPROVEMENT PLANS FOR
RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL PLAN
N 7th STREET / BANNON STREET
CITY OF SACRAMENTO, CA

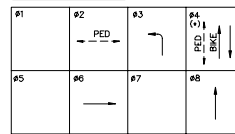
Anderson
Transportation Engineers
3853 Taylor Road, Suite G
Loomis, California 95650

SHEET
TS-4
OF
10

CONSTRUCTION NOTES (THIS SHEET ONLY)

- FURNISH AND INSTALL TS2 TYPE 1, TYPE "M" CABINET AND FOUNDATION, ATC/EX TS2 TYPE 2 CONTROLLER, DA SOFTWARE, CS500 E-2000-RTG-D-9, TRIPLETE ISOBAR 6 SURGE PROTECTOR AND ALL ASSOCIATED EQUIPMENT. DOOR SHALL OPEN TO THE EAST. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.
- FURNISH AND INSTALL A METERED SERVICE PEDESTAL FOR TRAFFIC SIGNAL PER CITY STANDARDS AND CITY STANDARD DRAWING. FRONT DOOR SHALL OPEN TO THE SIDEWALK.
- FURNISH AND INSTALL AUTOSCOPE VISION VIDEO DETECTION CAMERA ON SIGNAL MAST ARM WITH 28" RISER. REFER TO DETAIL SHEET TS-7. DETECTION SYSTEM SHALL BE PROGRAMMED PER CITY STANDARDS.
- INSTALL 4" C, 3/4", 1/8" ØØ FROM SERVICE CABINET TO SERVICE POINT. CONTACT SMOI FOR SERVICE HOOK-UP. CONTRACTOR SHALL INCLUDE AS PART OF HIS WORK ALL COSTS ASSOCIATED WITH SERVICE INSTALLATION.
- INSTALL 2" C, 2/8" THW (CONTROLLER), 3/8" THW (LIGHTING), 1/10" THW, 3/4" THW (PHOTO CELL).
- FURNISH AND INSTALL GPS PRIORITY CONTROL UNIT ON POLE, REFER TO DETAIL SHEET TS-7. GPS SHALL BE PROGRAMMED PER CITY STANDARDS.
- REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- INSTALL 2-2" C, 1-12 STRAND SMFO, 2 LRT PRE-EMPT COMMUNICATION CABLES.
- INSTALL 2-3" C, SIGNAL CONDUCTORS AND CABLES.
- FURNISH AND INSTALL PTZ CCTV CAMERA (AVIS 06155-E) WITH MAST ARM PARAPET MOUNT. INSTALL BELLON CAT6 CABLE 7927A TO CONTROLLER CABINET.
- TERMINATE FIBER CABLE IN CONTROLLER CABINET.
- FURNISH AND INSTALL SIGNAL HEAD WITH BICYCLE INDICATIONS PER STATE STANDARD PLAN 25-4C.
- FURNISH AND INSTALL MODIFIED POLE WITH SIGNAL MAST ARM MOUNTED HIGHER ON POLE TO PROVIDE CLEARANCE ABOVE OVERHEAD LRT CONTACT SYSTEM LINES. SEE DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE TEAM.
- FURNISH AND INSTALL R3-1 ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL W10-7 ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL W10-MOD ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- PROVIDE AND CAP TENON FOR FUTURE USE.

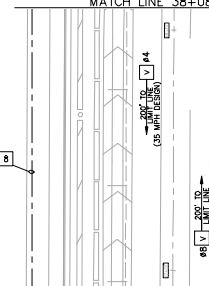
EVP ASSIGNMENTS	CABINET	CARD	PHASE
EV3	CH A	#6	
EV4	CH B	#3+#6	
EV5	CH C	#4	



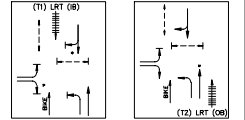
PROPOSED PHASE DIAGRAM

OLA = #2 + #3
(*) = #6 R3-1 ACTIVATED SIGN ON

(SEE LEFT)
MATCH LINE 38+08



MATCH LINE 36+94
(SEE SHEET TS-5)



PROPOSED LRT PROPRIETARY PRE-EMPTION

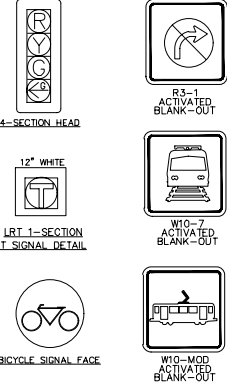
- (T1) = LRT IB TRAIN SIGNAL
- (T2) = LRT OB TRAIN SIGNAL
- LRT (OB) = LRT INBOUND TO DOWNTOWN
- LRT (OB) = LRT OUTBOUND FROM DOWNTOWN
- * = ACTIVATED SIGNALS ON



Know what's below,
Call before you dig.

POLE AND EQUIPMENT SCHEDULE										
LOCATION	STANDARD	#	TYPE	SEC.	VEN. SIGNALS	#	TYPE	SEC.	MTG.	NOTES
(A)	15TS	4	1WXL	12"	SV-1-T	4	1WXL	12"	SP-1-T	12' 73W LED
(B)	1-B	2	1WXL	12"	TV-5-T	4	1WXL	12"	SP-1-T	12' 73W LED
(C)	(MODIFIED) 26-4-100	3	1WXL	12"	MAT SV-2-T	4	1WXL	12"	SP-1-T	12' 73W LED
(D)	16-3-100	6	1WXL	12"	MAT SV-2-T	4	1WXL	12"	SP-1-T	12' 73W LED
(E)	(MODIFIED) 24-4-100	4	1WXL	12"	MAT SV-1-T	4	1WXL	12"	SP-1-T	12' 73W LED
(F)	1-B	6	1WXL	12"	TV-1-T	4	1WXL	12"	SP-1-T	12' 73W LED

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE EOI eLite Stor SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 700 (TYPE 3 DISTRIBUTION).

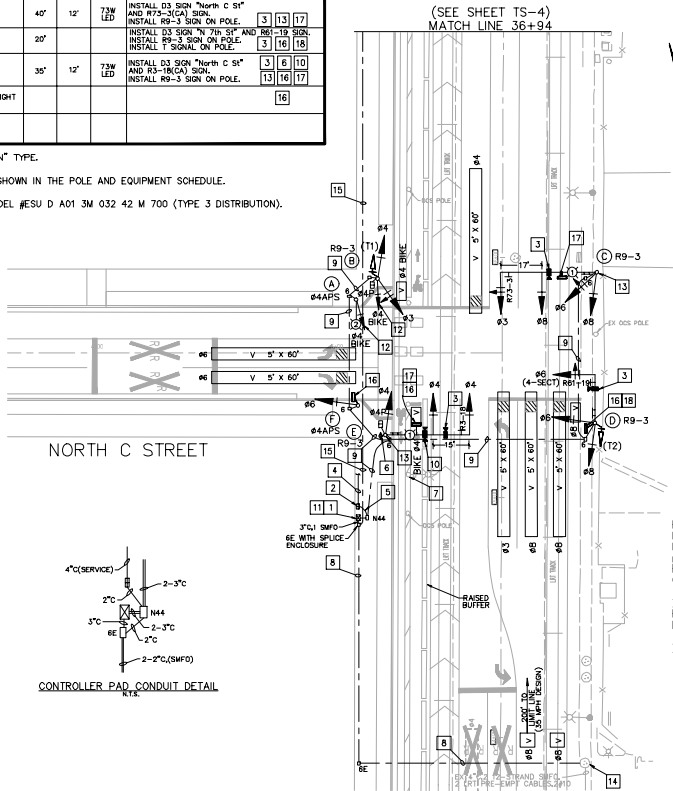


LUMINAIRE SCHEDULE:

NEW METERED SERVICE NO. _____ IS LOCATED AT THE SOUTHWEST CORNER OF N 7th ST / NORTH C ST.

CIRCUIT NUMBER	NEW 73W LED	MAT ARM
1	2	
2	1	
TOTAL	3	

- CONNECT LUMINAIRES TO 120V CIRCUITS.
- NEW SERVICE IS 120/240V, 1A, 3 WIRE.



(SEE SHEET TS-4)
MATCH LINE 36+94

N 7th STREET

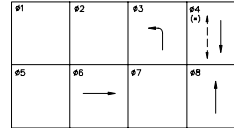
NORTH C STREET

CONTROLLER PAD CONDUIT DETAIL

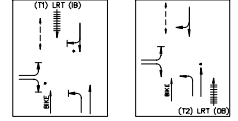
CONSTRUCTION NOTES (THIS SHEET ONLY)

- FURNISH AND INSTALL TS2 TYPE 1, TYPE "B" CABINET AND FOUNDATION, ATC/EX TS2 TYPE 2 CONTROLLER, 04 SOFTWARE, CIED 0-2000-8TC-C-H, TRIMPLITE SIGNAL & SURGE PROTECTOR AND ALL ASSOCIATED EQUIPMENT. DOOR SHALL OPEN TO THE EAST. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.
- FURNISH AND INSTALL A METERED SERVICE PEDIESTAL FOR TRAFFIC SIGNAL PER CITY STANDARDS AND CITY STANDARD DRAWING. FRONT DOOR SHALL OPEN TO THE SIDEWALK.
- FURNISH AND INSTALL AUTOSCOPE VISION VIDEO DETECTION CAMERA ON SIGNAL MAST ARM WITH 28" RISER. REFER TO DETAIL SHEET TS-7. DETECTION SYSTEM SHALL BE PROGRAMMED PER CITY STANDARDS.
- INSTALL 4" 3/4", 1/4" 0.00 FROM SERVICE CABINET TO SERVICE POINT. CONTACT SMUD FOR SERVICE HOOD-UP. CONTRACTOR SHALL INCLUDE AS PART OF HIS WORK ALL COSTS ASSOCIATED WITH SERVICE INSTALLATION.
- INSTALL 2" 286 THW (CONTROLLER), 3/8" THW (LIGHTING), 1/4" THW, 3/4" THW (PHOTO CELL).
- FURNISH AND INSTALL GPS PRIORITY CONTROL UNIT ON POLE. REFER TO DETAIL SHEET TS-7. GPS SHALL BE PROGRAMMED PER CITY STANDARDS.
- REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- INSTALL 2-3" 2-12 STRAND SMFO, 4 LRT PRE-EMPT COMMUNICATION CABLES.
- INSTALL 2-3" 2-12 STRAND SMFO.
- FURNISH AND INSTALL PTZ CITY CAMERA (AND 00100-D) WITH MAST ARM PARAPET MOUNT. INSTALL BULBON CAT6 CABLE 7527A TO CONTROLLER CABINET.
- TERMINATE FIBER CABLE IN CONTROLLER CABINET.
- FURNISH AND INSTALL SIGNAL HEAD WITH BICYCLE INDICATIONS PER STATE STANDARD PLAN ES-4C.
- FURNISH AND INSTALL GPS PRIORITY CONTROL UNIT ON POLE. REFER TO DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.
- INSTALL CONDUIT, FIBER CABLES AND LRT PRE-EMPT CABLES TO COMMUNICATION VAULT. COORDINATE WITH CITY TRAFFIC OPERATIONS FOR CABLE, SPLICING AND INSTALLATION REQUIREMENTS.
- INSTALL 2-3" 2-12 STRAND SMFO, 2 LRT PRE-EMPT COMMUNICATION CABLES.
- FURNISH AND INSTALL R3-1 ACTIVATED BLANK-OUT SIGN. SEE DETAIL THIS SHEET.
- FURNISH AND INSTALL W10-7 ACTIVATED BLANK-OUT SIGN. SEE DETAIL THIS SHEET.
- FURNISH AND INSTALL W10-MOD ACTIVATED BLANK-OUT SIGN. SEE DETAIL THIS SHEET.

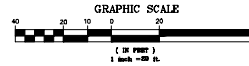
EVP ASSIGNMENTS		
CABINET	CARD	PHASE
EVS	CH A	#6
EV4	CH B	#3+8
EVS	CH C	#4



(-) = #6 R3-1 ACTIVATED SIGN ON
PROPOSED PHASE DIAGRAM



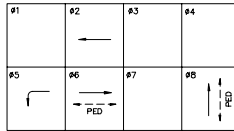
PROPOSED LRT PROPRIETARY PRE-EMPTION
(11) = LRT 1B TRAIN SIGNAL
(12) = LRT 0B TRAIN SIGNAL
LRT (OB) = LRT OUTBOUND FROM DOWNTOWN
+ = ACTIVATED SIGNS ON



REVISIONS				BENCH MARK		FIELD BOOK		CITY OF SACRAMENTO				OFF-SITE IMPROVEMENT PLANS FOR				SHEET	
NO.	DESCRIPTION	DATE	BY	ELEV. 73488.0 (AUG 09)				DEPARTMENT OF PUBLIC WORKS				RICHARDS BLVD OFFICE COMPLEX				TS-5	
				DESCRIPTION		SCALE						TRAFFIC SIGNAL PLAN				OF	
				CITY B.M. 387-C		HORIZ. 1"=20'		DRAWN BY: M.BRECHER				N 7th STREET / NORTH C STREET				10	
				MARK SET IN TRAFFIC SIGNAL BASIS, SE CORNER		VERT. 1"=20'		FILE: _____				CITY OF SACRAMENTO, CA					
				OF RICHARDS BLVD & SEDONA PARKED BLVD				DESIGN BY: M.BRECHER									
								R.C.E. _____									
								DATE: 11/3/20									
								CHECKED BY: K.ANDERSON									
								R.C.E. _____									
								DATE _____									

POLE AND EQUIPMENT SCHEDULE											
LOCATION	STANDARD	VEN. SIGNALS	PED. SIGNALS	P.P.B.	MAST ARM LENGTH	LUM. WATT.	NOTES				
		TYPE	SEC.	MTG.	#	TYPE	MTG.	#	ARROW	TRAFF.	ST.L.T.
(A)	26-4-100	1WGL	12"	MAS	1	1WGL	12"	1	40'	15'	73W LED
(B)	17-3-100	1WGL	12"	MAS	1	1WGL	12"	1	20'	12'	73W LED
(C)	19-4-100	1WGL	12"	MAS	1	1WGL	12"	1	30'	12'	73W LED
(D)	1-8	1WGL	12"	TV-1-T	1	1WGL	12"	1	RIGHT		
(E)	PBA								LEFT		
(F)	10TS	1WGL	12"	SV-2-T	1	1WGL	12"	1			73W LED

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE EOL Elite Star SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 700 (TYPE 3 DISTRIBUTION).

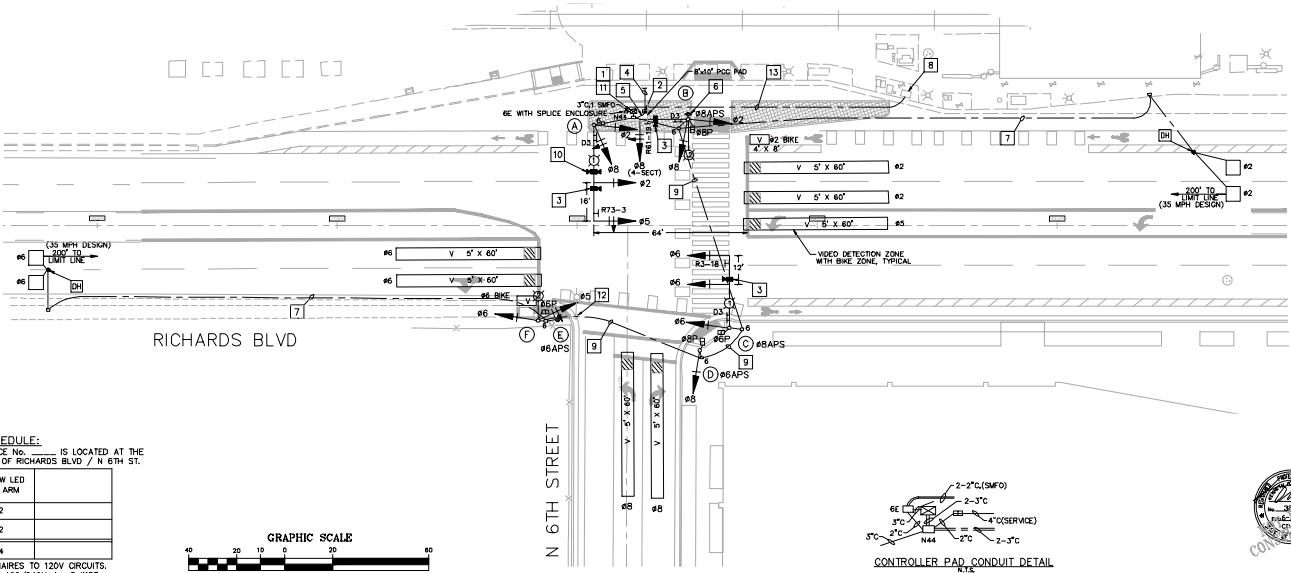


PROPOSED PHASE DIAGRAM

EVP ASSIGNMENTS			
CABINET	CARD	PHASE	
EVS	CH A	#6	
EVS	CH B	#2 & #5	
EVS	CH C	#8	

CONSTRUCTION NOTES (THIS SHEET ONLY)

- FURNISH AND INSTALL TS2 TYPE 1, TYPE "H" CABINET AND FOUNDATION, AT/EX TS2 TYPE 2 CONTROLLER, D4 SOFTWARE, CISCO E-2000-8TC-G-B, TRIPPLITE ISOBAR 6 SURGE PROTECTOR AND ALL ASSOCIATED EQUIPMENT. DOOR SHALL OPEN TO THE SOUTH. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.
- FURNISH AND INSTALL A METERED SERVICE PEDestal FOR TRAFFIC SIGNALS PER CITY STANDARD. DETAIL DRAWING. FRONT DOOR SHALL OPEN TO THE SIDEWALK.
- FURNISH AND INSTALL AUTOSCOPE VISION VIDEO DETECTION CAMERA ON SIGNAL MAST ARM WITH 28" RISE. REFER TO DETAIL SHEET TS-2. DETECTION SYSTEM SHALL BE PROGRAMMED PER CITY STANDARDS.
- INSTALL 4"CS, 3/8", 1/4" GND FROM SERVICE CABINET TO SERVICE POINT. CONTACT SMUD FOR SERVICE HOOK-UP. CONTRACTOR SHALL INCLUDE AS PART OF HIS WORK ALL COSTS ASSOCIATED WITH SERVICE INSTALLATION.
- INSTALL 2"CS, 2/8" THW (CONTROLLER), 3/8" THW (LIGHTING), 1/4" THW, 3/4" THW (PHOTO CELL).
- FURNISH AND INSTALL QPS PRIORITY CONTROL UNIT ON POLE. REFER TO DETAIL SHEET TS-8. QPS SHALL BE PROGRAMMED PER CITY STANDARDS.
- INSTALL 2"CS, 2/8" THW, 1/4" THW GND.
- INSTALL 2-2"CS, 1-3/4" STRAND SMF TO EXISTING COMMUNICATION VAULT. COORDINATE WITH CITY TRAFFIC OPERATIONS FOR CABLE, SPLICING AND INSTALLATION REQUIREMENTS.
- INSTALL 2-3"CS, SIGNAL CONDUCTORS AND CABLES.
- FURNISH AND INSTALL PTZ CCTV CAMERA (ARIS 08155-E) WITH MAST ARM PARAPET MOUNT. INSTALL BELDON CAT5 CABLE 7927A TO CONTROLLER CABINET.
- TERMINATE FIBER CABLE IN CONTROLLER CABINET.
- REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- INSTALL 2-2"CS, 1-24 STRAND SMF.

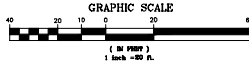


LUMINAIRE SCHEDULE

NEW METERED SERVICE NO. _____ IS LOCATED AT THE NORTHEAST CORNER OF RICHARDS BLVD / N 6TH ST.

CIRCUIT NUMBER	NEW 73W LED MAST ARM
1	2
2	2
TOTAL	4

- CONNECT LUMINAIRES TO 120V CIRCUITS.
- NEW SERVICE IS 120/240V, 1Ø, 3 WRE.



THIS PLAN ACCURATE FOR ELECTRICAL WORK ONLY

CITY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS

OFF-SITE IMPROVEMENT PLANS FOR
RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL PLAN
RICHARDS BLVD / N 6TH STREET
CITY OF SACRAMENTO, CA

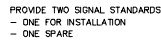
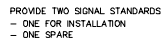
Anderson
Transportation Engineers
3853 Taylor Road, Suite G
Loomis, California 95650



Know what's below.
Call before you dig.

DCR
SHEET
TS-6
OF
10

1. MODIFIED POLE DIAMETER AND WALL THICKNESS TO BE AS DETERMINED BY POLE MANUFACTURER.
2. REFER TO CALTRANS 2018 STANDARD PLANS ES-7F AND ES-7G FOR STANDARD POLE DETAILS. STANDARD SIGNAL MAST ARM MOUNTING HEIGHT ON POLE IS 16 FEET.
3. PER CA MUTCD SECTION 401.5, THE TOP OF THE SIGNAL HOUSING OF A VEHICULAR SIGNAL FACE LOCATED OVER ANY PORTION OF A HIGHWAY THAT CAN BE USED BY MOTOR VEHICLES SHALL NOT BE MORE THAN 28.6 FEET ABOVE THE PAVEMENT.
4. SPARE POLES TO BE DELIVERED TO CITY OF SACRAMENTO SIGNAL MAINTENANCE YARD.



ORIGINAL SCALE IS IN INCHES

REVISIONS				BENCH MARK		FIELD BOOK		CITY OF SACRAMENTO				OFF-SITE IMPROVEMENT PLANS FOR				Anderson		SHEET	
DESCRIPTION				ELEV. 734.68 (NAD83)				DEPARTMENT OF PUBLIC WORKS				RICHARDS BLVD OFFICE COMPLEX				Transportation Engineers		TS-7	
NO.				DATE		BY						TRAFFIC SIGNAL PLAN				3853 Taylor Road, Suite G		OF	
												MODIFIED SIGNAL STANDARDS				Loomis, California 95650		10	



1. CONTRACTOR IS TO PROVIDE ALL NECESSARY EQUIPMENT IN TRAFFIC CABINET TO PROVIDE COMMUNICATION TO THE TRAFFIC OPERATION CENTER.
2. CONTRACTOR SHALL FURNISH ALL MOUNTING HARDWARE FOR COMMUNICATION EQUIPMENT.
3. ALL WIRES SHALL BE WIRE TIED IN PLACE AND ALL WIRES SHALL BE WELL ORGANIZED.
4. WHENEVER POSSIBLE, CONNECTORS SHALL BE FACTORY MADE.
5. NUMBER OF DEVICES VARIES BY INTERSECTION.



TYPICAL IN CABINET COMMUNICATION
MOUNTING FOR R CAB WITH FIBER
NO SCALE

REVISIONS						BENCH MARK NO. _____ DATE _____ BY _____ DESCRIPTION _____ ELEV. _____	FIELD BOOK	CITY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS	OFF-SITE IMPROVEMENT PLANS FOR RICHARDS BLVD OFFICE COMPLEX TRAFFIC SIGNAL PLAN TRAFFIC SIGNAL DETAILS CITY OF SACRAMENTO, CA	K.D. Anderson Transportation Engineers 3853 Taylor Road, Suite G Loomis, California 95650	DCR	SHEET TS-9 OF 10
NO.	DESCRIPTION	DATE	BY				SCALE	DRAWN BY: M.BECKER	DESIGN BY: M.BECKER	CHECKED BY: K.ANDERSON		
							HORIZ. NONE	FILE:	R.C.E. DATE 11/3/20	R.C.E. DATE		
							VERT.					

1. CONTRACTOR SHALL INSTALL ALL FIBER OPTIC CABLE PER MANUFACTURER'S RECOMMENDATIONS AND THE CITY'S PLANS AND SPECIAL PROVISIONS.
2. CONTRACTOR SHALL USE CITY APPROVED CONTRACTOR FOR ALL SPLICED WORK. ALL SPLICING PANELS AND SPLICING MATERIALS WILL BE PROVIDED BY THE CONTRACTOR DURING CITY APPROVED CONTRACTOR.
3. THE CONTRACTOR SHALL TEST ALL FIBER OPTIC CABLE SPANS AFTER INSTALLATION OF THE CABLE. THE TEST RESULTS SHALL BE PROVIDED TO THE CONTRACTOR. THE TESTS SHALL DEMONSTRATE FIBER OPTIC CABLE STILL MEETS THE MANUFACTURE SPECIFICATIONS AFTER INSTALLATION. CITY SHALL APPROVE TEST RESULTS. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE TESTS. IF THE CITY SPLICED WORK SHALL BE PERFORMED BY A CITY APPROVED CONTRACTOR.
4. THE CONTRACTOR SHALL MAINTAIN A RECORD OF ALL SHEATH FRETAGE MARKINGS FOR ALL FIBER OPTIC CABLE. THE RECORD SHALL BE PROVIDED TO THE CITY WITH TEST RESULTS ALONG WITH THE PROGRAM TO REVIEW THE SPT.
5. EXISTING FIBER OPTIC CABLE MUST BE PROTECTED FROM DAMAGE. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR 24 HOURS PRIOR TO WORKING NEAR ANY EXISTING FIBER OPTIC CABLE.
6. DURING INSTALLATION THE TENSILE FORCE SHALL NOT EXCEED 600 LBS. THE CONTRACTOR SHALL USE A BREAK AWAY SWIVEL, OR A SLIP-CLIP CAPSTAN, SET FOR LESS THAN 600 LBS.
7. THE CONTRACTOR SHALL INSTALL FIBER MARKING TAGS SHALL BE INSTALLED ON FIBER OPTIC CABLE IN EVERY PULL BOX. THE TAGS SHALL BE NON-ADHESIVE, HELLENKAMP-17749 4 FIBER MARKING, PART NUMBER 020 OR APPROVED EQUIV.
8. THE CONTRACTOR SHALL MARK BOLD LINE PANT IMPVLC WITH TRACE WORN OR WITH WHITE MARKING.

1. FIBER OPTIC CABLE SHALL BE CORNING ALTOX ALL-DIELECTRIC GEL-FREE OR APPROVED EQUAL. SEE SPECIAL PROVISIONS. APPROVAL SHALL BE BY TRAFFIC OPERATION STAFF.
2. CONTRACTOR SHALL INSTALL FIBER PER MANUFACTURE RECOMMENDATION.
3. CONTRACTOR SHALL USE THE FOLLOWING CABLE TYPES AS LISTED BELOW OR APPROVED EQUAL. APPROVAL SHALL BE BY THE CITY'S TRAFFIC SIGNAL OPERATIONS STAFF.

FIBER OPTIC CABLE		
DESCRIPTION	PART #	MANUFACTURER
12 STRAND	012EU4-T4301D20	CORNING
24 STRAND	024EU4-T4101D20	CORNING
48 STRAND	048EU4-T4101D20	CORNING
96 STRAND	096EU4-T4301D20	CORNING

1. CONTRACTOR SHALL USE CITY APPROVED FIBER CONTRACTOR FOR ALL FIBER TERMINATION.
2. A LIST OF CITY APPROVED FIBER TERMINATION CONTRACTORS CAN BE OBTAIN FROM THE CITY'S INFORMATION TECHNOLOGY DEPARTMENT AT 808-8785 OR FROM TRAFFIC SIGNAL OPERATIONS GROUP AT 808-6796.
3. ALL TERMINATION / SPlice WORK WILL BE PERFORMED BY CITY APPROVED CONTRACTOR. ALL CABLES AND SPlice MATERIALS WILL BE PROVIDED BY CITY APPROVED CONTRACTOR.
4. THE CONTRACTOR SHALL CONTACT THE TRAFFIC SIGNAL OPERATIONS GROUP AT 808-6796 FOR FIBER TERMINATION TABLE AND/OR DIAGRAMS.
5. THE CONTRACTOR SHALL HAVE CITY APPROVED CONTRACTOR TEST ALL FIBER OPTIC CABLES PRIOR TO BEING USED. THE CITY INSPECTOR AFTER THE FIBER OPTIC CABLE TESTS DEMONSTRATE THE FIBER OPTIC CABLE STILL MEETS THE MANUFACTURER'S SPECIFICATIONS, THE CABLE AND TERMINATION WORK WILL BE ACCEPTED. THE CITY INSPECTOR WILL SIGN OFF ON THE FIBER OPTIC CABLE TESTS.

FIBER SPLICER EQUIPMENT			
DESCRIPTION	PART #	MANUFACTURER	NOTE
FIBER PATCH PANEL (VWALL MOUNT)	WSPR15P-45-30BCD	CONRING	FOR "R" CABINET
FIBER PATCH PANEL (VWALL MOUNT)	WSPR15P-45-30BCD	CONRING	FOR "T" CABINET
FIBER PATCH PANEL	PR15P15-45-30BCD	CONRING	CAUTION 332/333
FIBER PATCH PANEL	PR15P15P-45-30HFD	CONRING	MURS
OPTICAL CLOSURE	8000560	PERFORMED LINK	FOR 60 BX BOX
OPTICAL CLOSURE SPLICER TRAY	8000554	PERFORMED LINK	FOR 60 BX BOX
			FOR 60 BX BOX
SW DUPLEX JUMPERS LC-LC GREEN	04046503020	CONRING	FOR 60 BX BOX
SW DUPLEX JUMPERS LC-LC GREEN	04046503020	CONRING	SIGNAL CABINET
SW DUPLEX JUMPERS LC-LC GREEN	04046503020	CONRING	HAIR CABINET

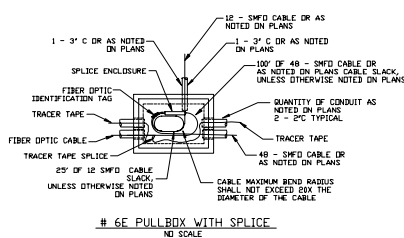
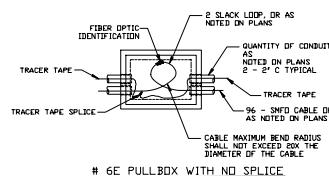
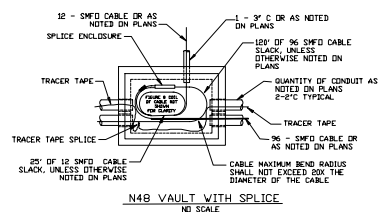
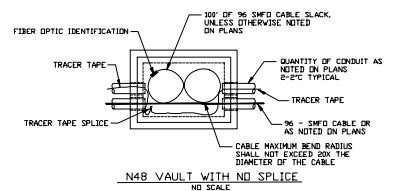
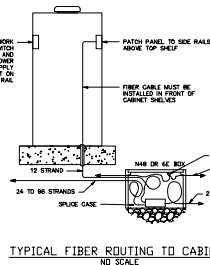
* ALL SPlicing EQUIPMENT SHALL BE APPROVED BY TRAFFIC OPERATION STAFF

ALL TESTING SHALL BE PERFORMED ACCORDING TO THE TELECOMMUNICATIONS
INDUSTRY ASSOCIATION (TIA) TECHNICAL SERVICE BULLETIN TSB-140, ADDITIONAL
GUIDELINES FOR FIELD - TESTING LENGTH, LOSS AND POLARITY OF OPTICAL FIBER
CARRYING SYSTEMS.

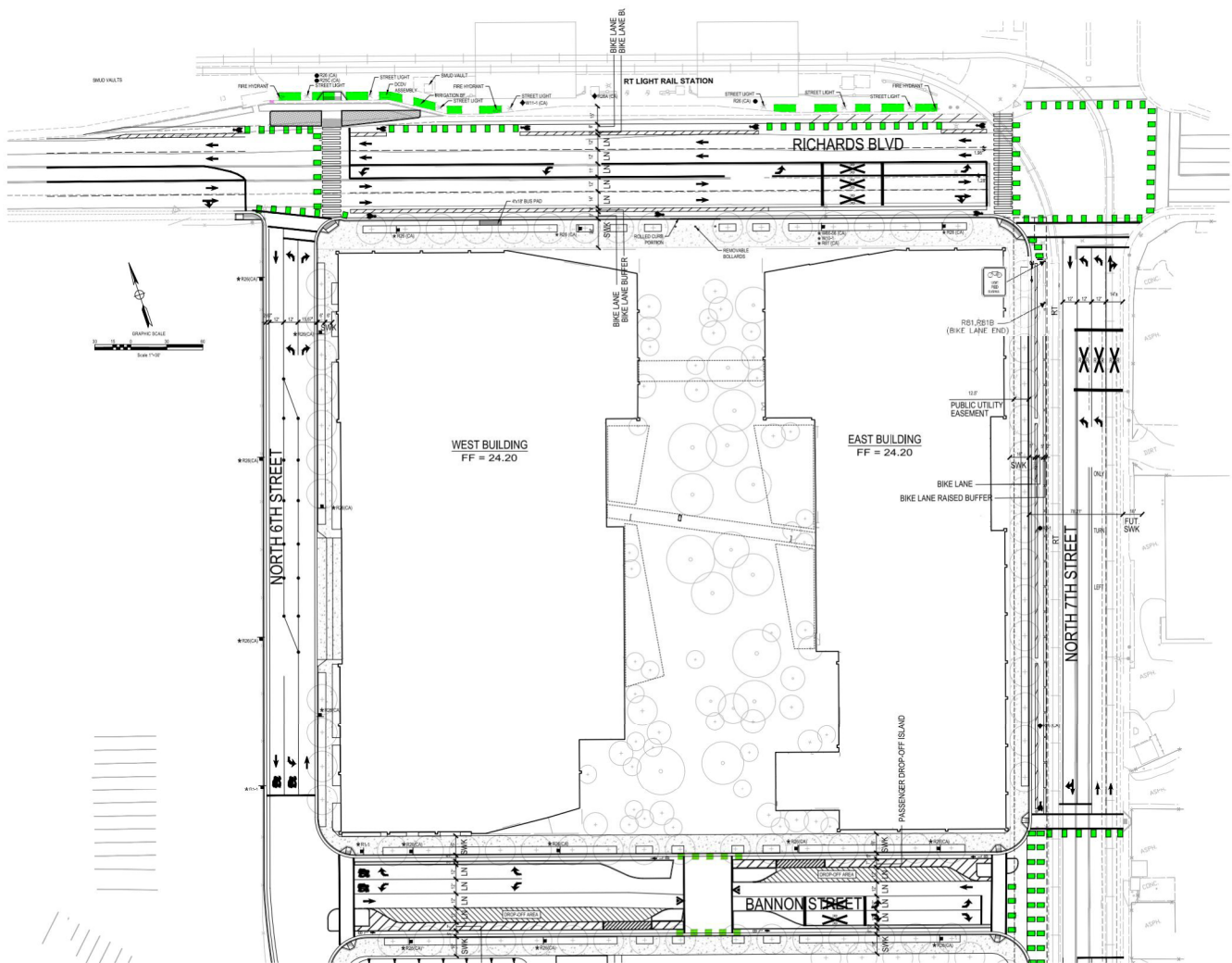
1. THE CONTRACTOR MAY TEST THE FIBER OPTIC CABLE PRIOR TO INSTALLATION, BUT MUST TEST FIBER OPTIC CABLE AFTER INSTALLATION.
2. THE CONTRACTOR SHALL TEST EACH FIBER IN THE CABLE.
3. A CONTINUITY TEST USING A POWER METER SHALL BE USED FOR 12 STRAND CABLES LESS THAN 200 FEET. POWER READING SHALL BE PROVIDED WITH TEST RESULTS.
4. THE CONTRACTOR SHALL USE WITH A POWER METER TEST FOR CONTINUITY AND AN OPTICAL LOSS TEST FOR CABLES LONGER THAN 200 FEET. OTHER CABLE SPANS GREATER THAN 12 STRANDS OR LONGER THAN 200 FEET MUST BE PROOF OF CALIBRATION OF THE TEST EQUIPMENT. THE CONTRACTOR SHALL PROVIDE THE INSPECTOR AT ANY TIME, AND MUST BE PROVIDED ALONG WITH THE TEST RESULTS.
5. THE FIBER OPTIC CABLE SHALL MEET OR EXCEED ANSI/EIA/TIA - 568B AND THE TEST TIME SHALL BE WITHIN THE FOLLOWING:
 - TOTAL FIBER LENGTH
 - NUMBER OF FIBER RANGES FOR COMPLETE FIBER LENGTH
 - LOSSES OF ALL ANNEALS
 - MANUFACTURER'S TESTED AND MEASUREMENT DIRECTIONS
 - MANUFACTURER, MODEL NUMBER AND SERIAL NUMBER OF TEST EQUIPMENT
 - NAME AND SIGNATURE OF THE CONTRACTOR
 - TEST EQUIPMENT CALIBRATION CERTIFICATE FOR ALL FIBER TEST EQUIPMENT
 - TEST DATE
6. THE CONTRACTOR SHALL PROVIDE THE TEST RESULTS TO THE CITY INSPECTOR. IF FIBER OPTIC CABLE FAILS TO MEET CABLE TESTING STANDARDS AND ARE NOT APPROVED BY THE CITY, THE CONTRACTOR SHALL REMOVE THE FAILED FIBER OPTIC CABLE AND RE-TEST THE CABLE. IF THE CABLE IS APPROVED BY THE CITY, THE NEW FIBER OPTIC CABLE SHALL BE TESTED ACCORDING TO CABLE TESTING STANDARDS.

1. THE TRAFFIC SIGNAL CONTROLLER SHALL COMMUNICATE VIA ETHERNET INTERFACE MODULE IF A NETWORK SWITCH OR ETHERNET OVER COPPER DEVICE IS SPECIFIED, THEN THE TRAFFIC CONTROLLER SHALL HAVE ETHERNET INTERFACE MODULE.
2. CONTRACTOR SHALL MAKE ALL NECESSARY CONNECTION TO PROVIDE COMMUNICATION TO THE CITY OF SACRAMENTO'S TRAFFIC OPERATION CENTER EXCEPT FOR FIBER SPLICES, FIBER SPLICES SHALL BE COMPLETED BY CITY FORCES AND SHALL BE COMPLETED BEFORE SIGN

1. CITY OF SACRAMENTO, TRAFFIC OPERATION CENTER, (916) 808-5067
2. CITY OF SACRAMENTO, DEPARTMENT OF INFORMATION TECHNOLOGY, (916) 808-8785



6/17/2020 3:05:03 PM



OWNER
SUIT OF GENERAL SERVICES
107 1ST STREET
WEST SACRAMENTO, CA 95605
TEL: 916-390-5000
WWW.DGS.CA.GOV

CONTRACTOR
HENSEL PHELPS
225 AIRPORT PARKWAY
SUITE 100
SACRAMENTO, CA 95811
TEL: 916-452-1800
WWW.HENSELPHELPS.COM

TOWER & PODIUM ARCHITECT
ZUP
115 SOUTH FLOWER STREET
SUITE 3700
LOS ANGELES, CA 90071
TEL: 213-617-1001
WWW.ZUP.COM

PARKING & CIVIL ARCHITECT
DREYFUS & BLACKFORD
506 FOLKMAN BOULEVARD
SACRAMENTO, CA 95816
TEL: 916-453-1204
WWW.DREYFUSBLACKFORD.COM

STRUCTURAL
THORNTON TOMASETTI
301 HAWKING STREET, SUITE 1000
SAN FRANCISCO, CA 94105

MECHANICAL/PLUMBING
FRANK M. SCOTT
4225 DOUGLAS BOULEVARD
GRANITE BAY, CA 95746

ELECTRICAL
HOME ELECTRIC
4882 EAST OLIVE AVENUE
FREMONT, CA 94502

CIVIL
MORTON & RYLAND, INC.
400 COOLIDGE DRIVE, SUITE 140
FOLSOM, CA 95630

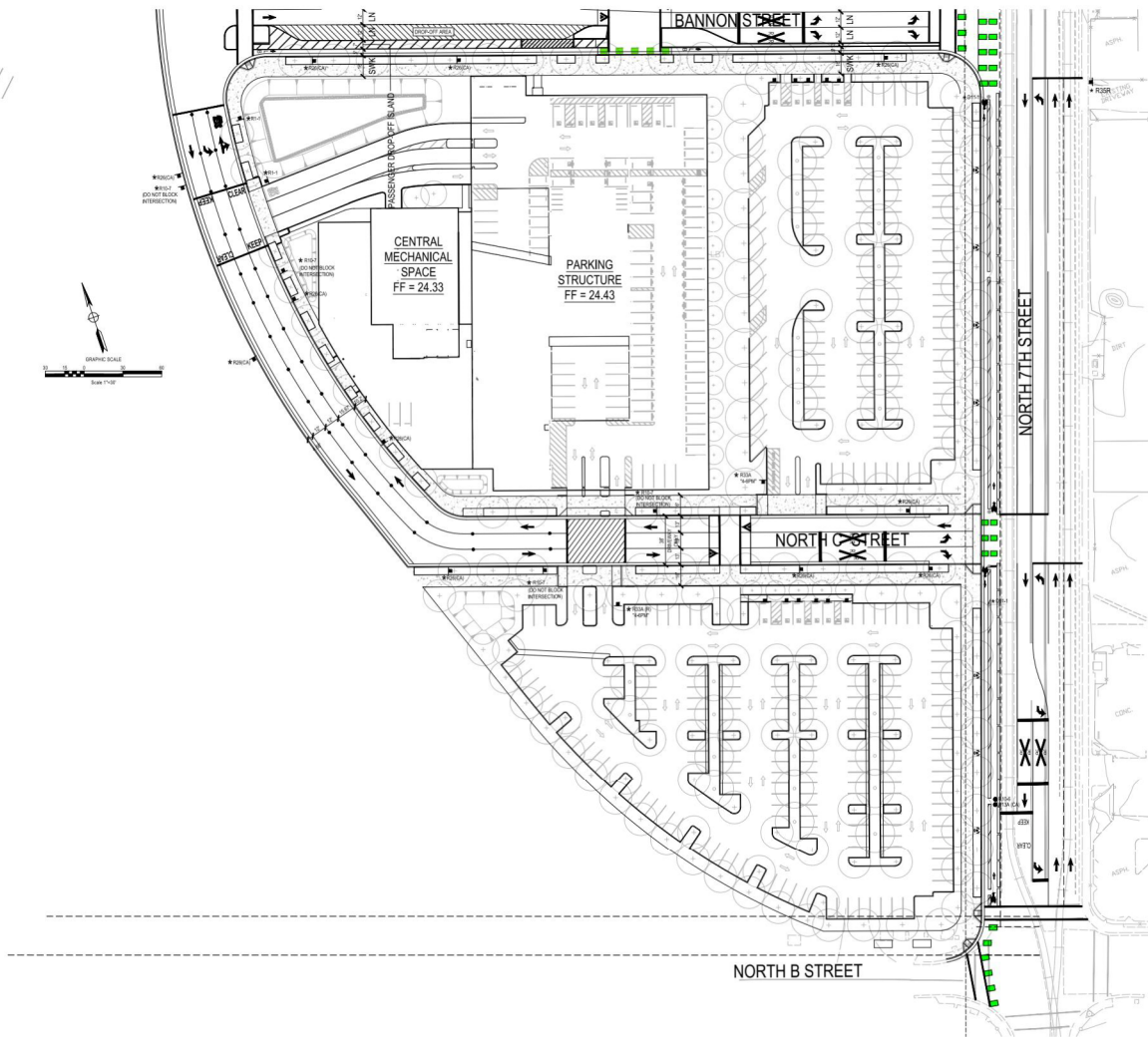
RICHARDS BOULEVARD OFFICE COMPLEX
651 BANNON STREET
201 NORTH 1ST STREET
SACRAMENTO, CA 95811

OVERALL STRIPING NORTH

Sheet

Date: 10/23/2020
Job No: 19-0624-001
Drawn By: J241
Checked By: J241
Printing Date: 10/23/2020

1



REGISTERED PROFESSIONAL ARCHITECT
HENSEL PHELPS
 1000 10th Street, Suite 100
 San Jose, CA 95128
 (408) 435-1800
 WWW.HENSELPHELPS.COM

OWNER
 CITY OF GENERAL SERVICES
 101 10th Street
 West Sacramento, CA 95605
 (916) 396-5500
 WWW.DGS.CA.GOV

CONTRACTOR
 HENSEL PHELPS
 225 Airport Parkway
 Suite 100
 San Jose, CA 95128
 (408) 435-1800
 WWW.HENSELPHELPS.COM

TOWER & PODIUM ARCHITECT
 ZUP
 115 South Flower Street
 Suite 1700
 Los Angeles, CA 90071
 (213) 617-1001
 WWW.ZUP.COM

PARKING & CIVIL ARCHITECT
 DREYFUS & BLACKFORD
 256 Folsom Boulevard
 Sacramento, CA 95816
 (916) 443-1234
 WWW.DREYFUSBLACKFORD.COM

STRUCTURAL
 THORNTON TOMASETTI
 301 Howard Street, Suite 1000
 San Francisco, CA 94105

MECHANICAL/PLUMBING
 FRANK M. BOOTH
 4222 Douglas Boulevard
 Granite Bay, CA 95746

ELECTRICAL
 HOME ELECTRIC
 488 East Olive Avenue
 Fresno, CA 93702

CIVIL
 MORTON & RYLAND, INC.
 400 Coolidge Drive, Suite 140
 Folsom, CA 95630

REGISTERED PROFESSIONAL ARCHITECT
RICHARDS BOULEVARD OFFICE COMPLEX
 651 BANNAN STREET
 201 NORTH 1ST STREET
 SACRAMENTO, CA 95811

Overall Striping
SOUTH

Sheet

Date: 10/20/2020

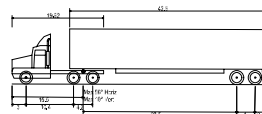
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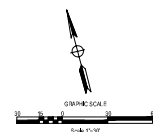
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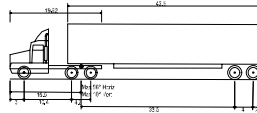
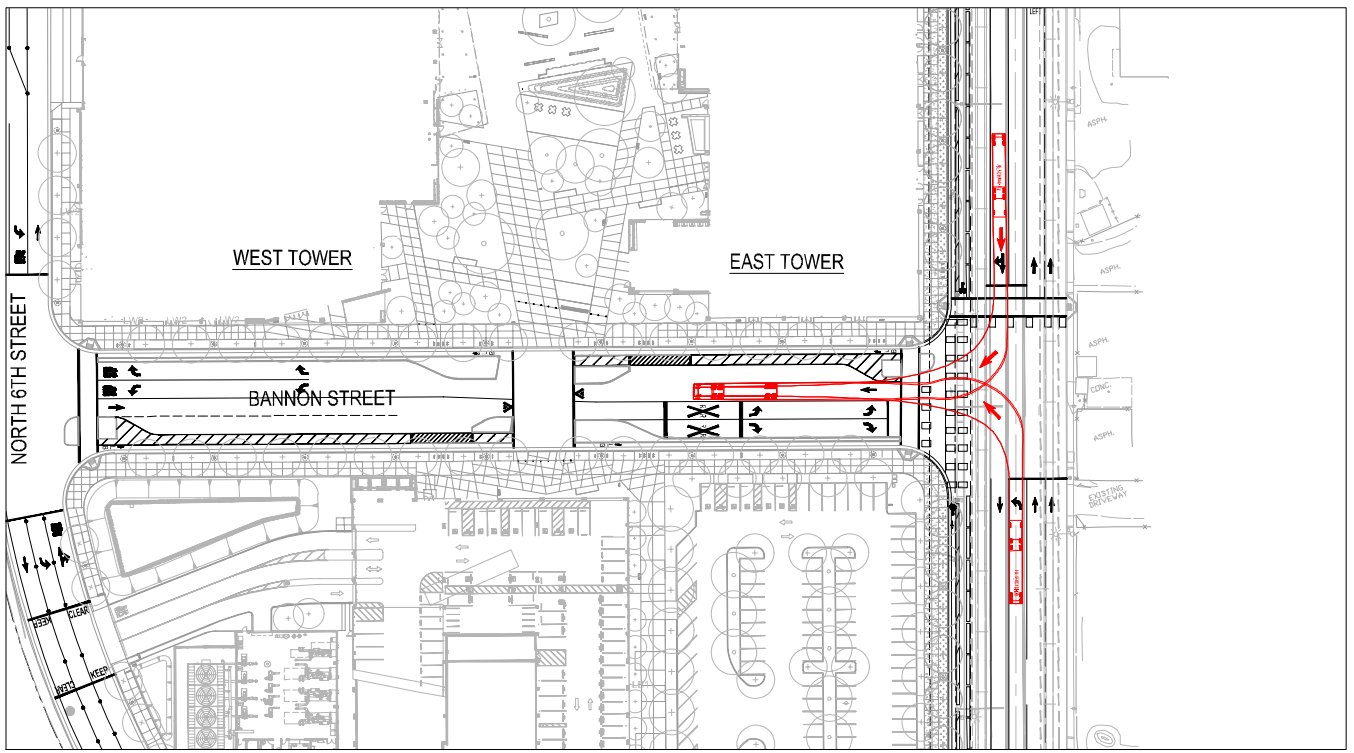
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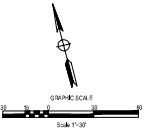
WB-50 - Intermediate Semi-Trailer	
Overall Length	55.00ft
Overall Width	8.50ft
Overall Body Height	12.05ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.50ft
Lock-to-lock time	6.00s



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 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1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 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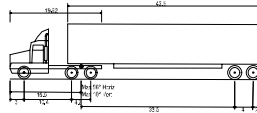
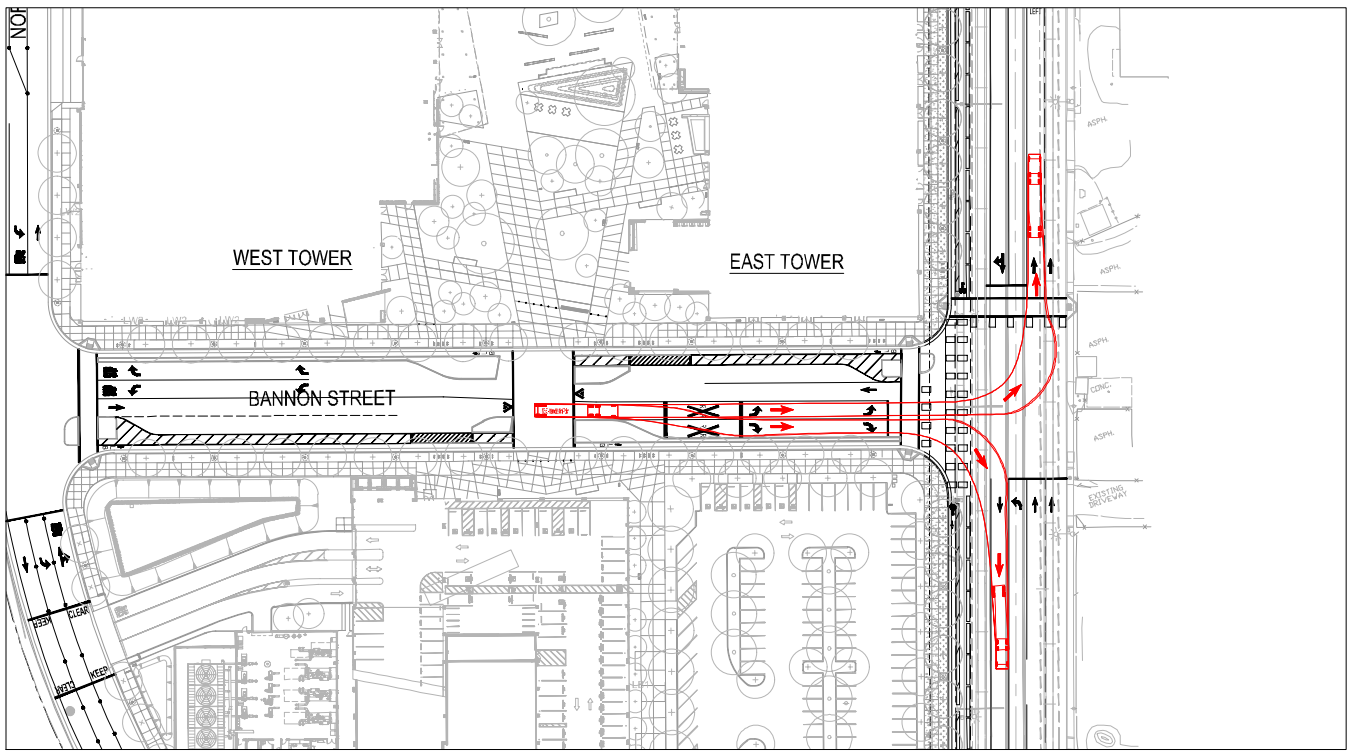


WB-50 - Intermediate Semi-Trailer
 Overall Length 42.0'
 Overall Width 8.50'
 Overall Body Height 12.05'
 Min Body Ground Clearance 1.234'
 Max Truck Width 8.50'
 Lock-to-lock time 6.00s

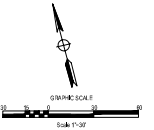


NO.	DESCRIPTION	DATE	BY	CHK	SCALE	BENCH MARK	COUNTY B.M. 97A-30	COMPILED	MC	DESIGNED	MP	DRAWN	MP	PROJ. ENGR.	EK	MORTON & PITALO, INC. CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING Richard • Sacramento • Fresno 7500 North Circle Suite 4100 Folsom, CA 95630 phone: (916) 942-6311 www.mortonpitalo.com	RICHARDS BLVD OFFICE COMPLEX TRUCK TURNING EXHIBIT WB-50 - N. 7TH TURN ONTO BANNON SACRAMENTO, CALIFORNIA	DATE 10/27/2020	SHEET 1 OF 1

JOB NO. 15-0041-00

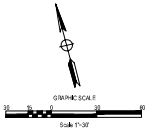


WB-50 - Intermediate Semi-Trailer
 Overall Length 13.0m
 Overall Width 4.2m
 Overall Body Height 12.05m
 Min Body Ground Clearance 1.234m
 Max Truck Width 8.50m
 Lock-to-lock time 6.00s



<div> <div>NO</div> <div>DESCRIPTION</div> <div>DATE</div> <div>BY</div> <div>CHK</div> </div>				SCALE: HORIZ. 1" = 30' VERT. 1" = 10'	BENCH MARK COUNTY B.M. 97A-30	COMPILED MC DESIGNED MP DRAWN MP PROJ. ENGR. EK	<div> <div>mp</div> <div> MORTON & PITALO, INC. CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING Redwood City • Sacramento • Fresno 7500 North College Ave. #100 Redwood City, CA 94061 phone: (415) 842-8311 www.mortonpitalo.com </div> </div>	RICHARDS BLVD OFFICE COMPLEX TRUCK TURNING EXHIBIT WB-50 - BANNON TURN ONTO N. 7TH SACRAMENTO, CALIFORNIA	DATE 10/27/2020 SHEET OF
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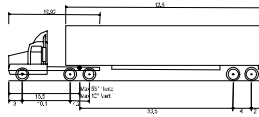
JOB NO. 15-0041-00



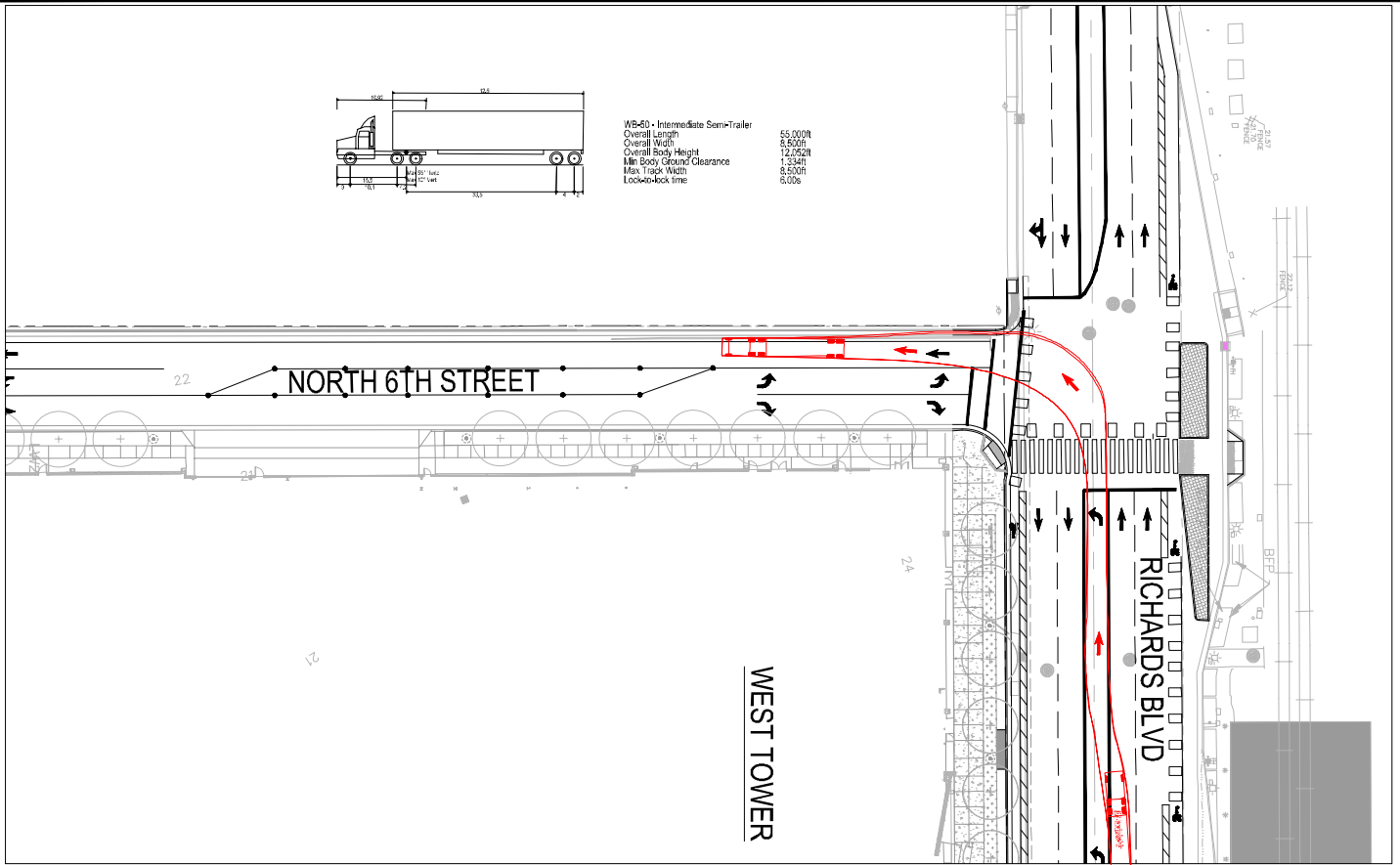
DATE
10/27/2020

SHEET

OF



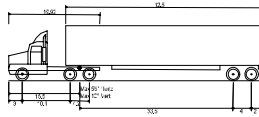
WB-50 - Intermediate Semi-Trailer
Overall Length 65.00ft
Overall Width 8.50ft
Overall Body Height 12.50ft
Min Body Ground Clearance 1.53ft
Max Tractor Width 8.50ft
Lock-to-Lock time 15.00s



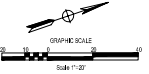
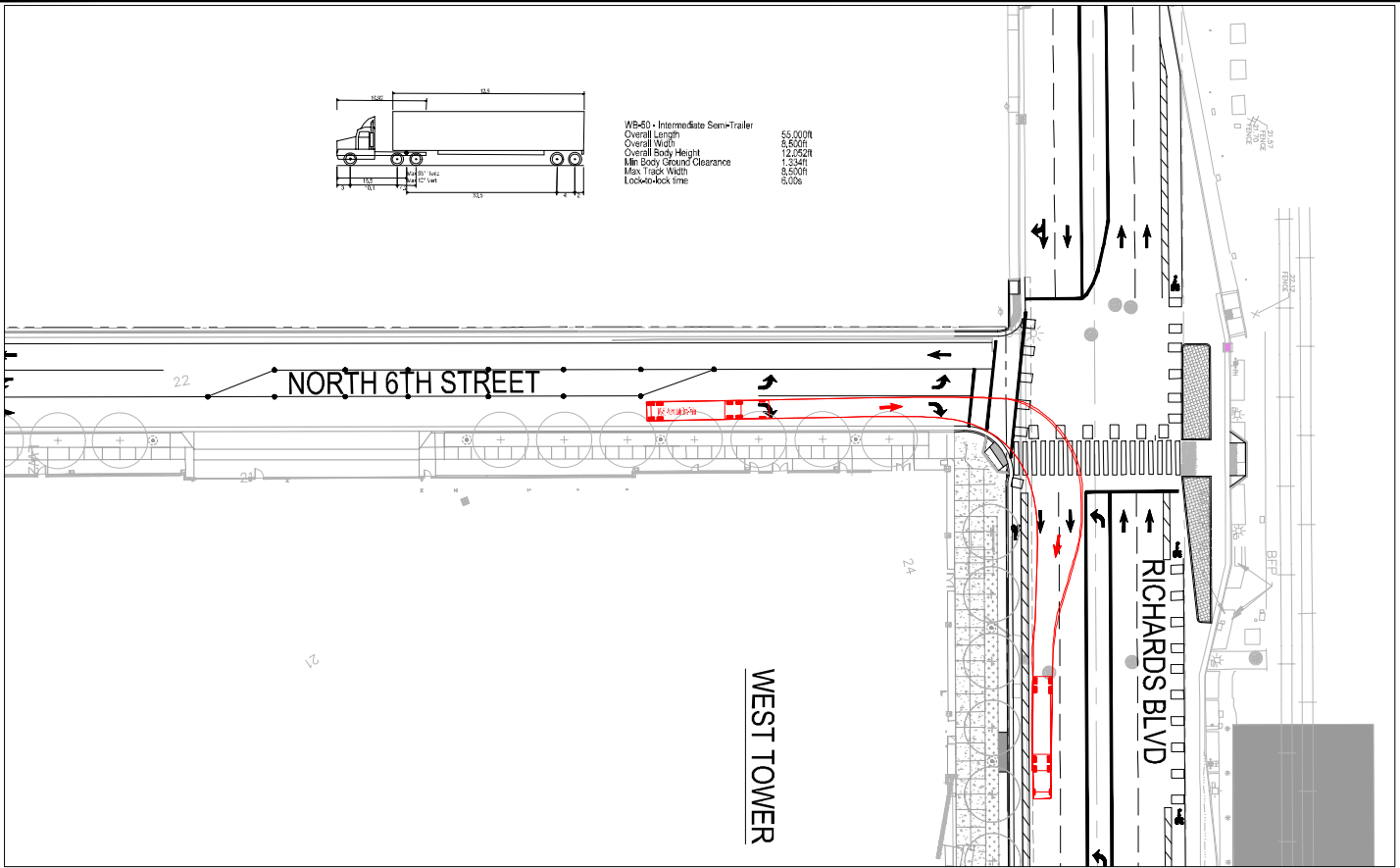
MORTON & PITALO, INC.
CIVIL ENGINEERING • LAND PLANNING • LAND ACQUISITION
Folsom • Sacramento • Fresno
7500 North Clarksdale #100
Folsom, CA 95630
phone: (916) 942-6100
www.mortonpitalo.com

RICHARDS BLVD OFFICE COMPLEX
TRUCK TURNING EXHIBIT
WB-50 - (WB) RICHARDS TURN ONTO NORTH 6TH
SACRAMENTO, CALIFORNIA

JOB NO. 15-0041-00



WB-50 - Intermediate Semi-Trailer
Overall Length 65'00"
Overall Width 8'6"
Overall Body Height 12'5"
Min Body Ground Clearance 1'5"
Max Tractor Width 8'6"
Lock-to-Lock time 15.00s



NO.	DESCRIPTION	DATE	BY	CHK
1	DESIGNED	10/27/2010	MP	MP
2	DRAWN	10/27/2010	MP	MP
3	PROJ. ENGR.	10/27/2010	EX	EX

SCALE:	BENCH MARK	COUNTY B.M. 97A-31
HORIZ. 1" = 30'		
VERT. 1" = 10'		



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7500 Folsom Blvd., Suite #100
Folsom, CA 95630
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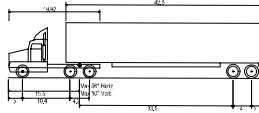
RICHARDS BLVD OFFICE COMPLEX
TRUCK TURNING EXHIBIT
WB-50 - NORTH 6TH TURN ONTO RICHARDS

DATE: 10/27/2010
SHEET: 1 OF 1
JOB NO.: 15-0041-00

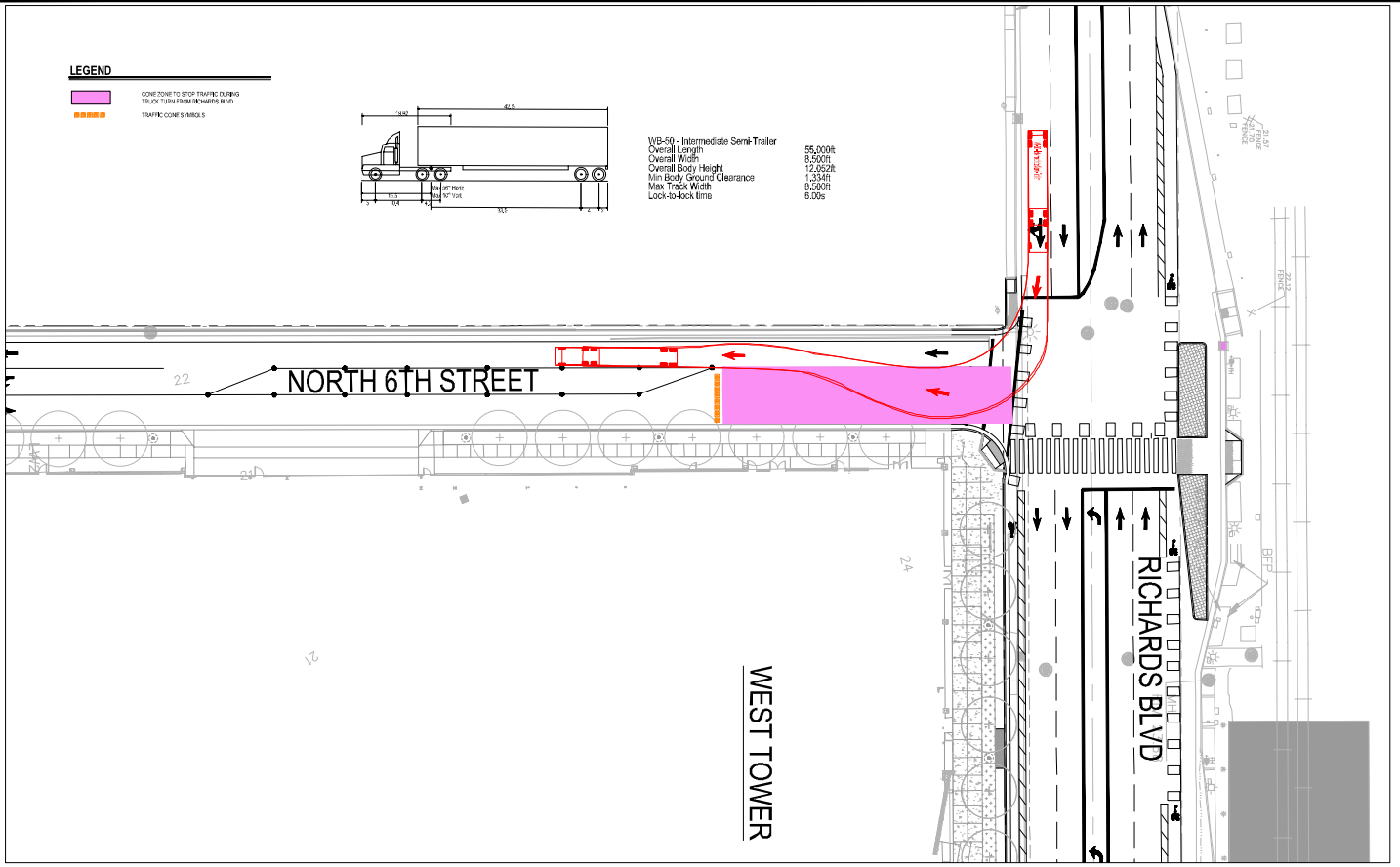
NOT FOR CONSTRUCTION

LEGEND

- COME TIME TO STOP TRUCK DURING TRUCK TURN FROM RICHARDS BLVD
- TRUCK COME'S SYMBOLS



WB-50 - Intermediate Semi-Trailer
 Overall Length 45.5
 Overall Width 8.5
 Overall Body Height 12.25
 Min Body Ground Clearance 1.25
 Max Track Width 8.5
 Lock-to-Lock time 6.0s



NO.	DESCRIPTION	DATE	BY	DATE
1	DESIGNED	11/11/11	MP	11/11/11
2	DRAWN	11/11/11	MP	11/11/11
3	PROJ. ENGR.	11/11/11	EX	11/11/11

SCALE:	BENCH MARK	COUNTY B.M. 97A-31
HORIZ. 1" = 30'		
VERT. 1" = 10'		

mp

MORTON & PITALO, INC.
 CIVIL ENGINEERING • LAND PLANNING • LAND DEVELOPMENT
 Redwood City • Sacramento • Fresno
 7500 Portola Drive, Suite 400
 Redwood City, CA 94061
 Phone: (415) 842-6100
 www.mortonpitalo.com

RICHARDS BLVD OFFICE COMPLEX
 TRUCK TURNING EXHIBIT
 WB-50 - (EB) RICHARDS TURN ONTO NORTH 6TH
 SACRAMENTO, CALIFORNIA

DATE: 11/07/2011
 SHEET: 1 OF 1
 JOB NO.: 15-0041-00

NOT FOR CONSTRUCTION

Appendix

Traffic Signal Preemption Technical Memorandum, Kimley Horn

Memorandum

To: Kenneth Anderson, P.E. and Mike Becker, P.E.
KD Anderson & Associates, Inc.

From: Robert Paderna, P.E.
Kevin Aguigui, P.E., T.E., E.E., CSEP

Re: **DGS Richards Boulevard - Traffic Signal Preemption Technical Memorandum**

Date: November 3, 2020

INTRODUCTION

This memorandum documents the light rail preemption operations for two proposed traffic signal installations to be constructed as part of the Richards Boulevard Office Complex (RBOC) project (the “project”). These two new traffic signals, which are to be located at the intersections of North 7th Street/Bannon Street and North 7th Street/North C Street (**Attachment A**), are proposed to provide site access the proposed redevelopment of the site located at the southwest quadrant of the Richards Boulevard/North 7th Street intersection into a Department of General Services (DGS) office building complex. As required by the City of Sacramento, a Design Concept Report (DCR) is being prepared by KD Anderson & Associates, Inc. for the new traffic signals and existing traffic signals to be modified as part of the project. The intent of this memorandum is to provide input on the light rail operational parameters for consideration in the DCR.

The Sacramento Regional Transit District (RT) currently operates the Green Line light rail along North 7th Street, with the northern terminus at the 7th & Richards/Township 9 LRT station located at the west leg of the Richards Boulevard/North 7th Street intersection. The Green Line LRT is in-street running along the segment of North 7th Street within the project area, with “Inbound” running in the southbound travel lane and “Outbound” running in the northbound travel lane. This memorandum presents recommended preemption operational strategy and timing for the interface between the LRT trains and the two new City-owned and maintained traffic signals.

EXISTING OPERATIONS

LRT train detection along the Green Line is currently provided by a combination of existing train to wayside communication (TWC) loop detectors, track circuits, and wheel detectors. These detection strategies are also used for traffic signal preemption. The interface between the LRT and the City traffic signal controllers are provided via existing preemption cables running along North 7th Street. This communication path between LRT detectors and the traffic signal controllers is critical to providing and maintaining preemption capabilities to optimize system performance and reduce delays at the intersections. **Attachment B** provides track plans which present the existing detector locations and distances used in development of the recommended preemption timing.

As an LRT train approaches a signalized intersection and a train is detected, a call is placed to the downstream traffic signal controller(s) to initiate the preemption phase. This would initiate the clear out

phase in which vehicular phases would be terminated; however, the controllers are not configured to truncate conflicting pedestrian phases, allowing the full pedestrian phase to be served. Delay timing, if entered, would delay the preempt timer in the traffic signal controller when the approach time (calculated based on 25 mph train speed) is higher than the required signal timing of the clear out phase. Once the delay timer expires, signal will go into the clearout phase. Once the clear out phase is complete, the designated phases in conflict with the LRT phase transitions to yellow and red before the point in which the LRT track signals are activated to indicate that it is clear for the LRT train to enter the intersection. Once the train passes the designated release detector, the track signal transitions to red and the traffic signal returns to normal operation once sufficient time has elapsed for the rear of the train to clear the intersection.

PREEMPTION BY INTERSECTION

North 7th Street/Bannon Street

The new intersection at North 7th Street/Bannon Street is proposed to be a “T-intersection” providing primary access to the RBOC site from North 7th Street. The proposed traffic signal will provide a protected northbound left-turn phase onto Bannon Street. Pedestrian phases will be provided crossing Bannon Street (west leg) and crossing North 7th Street (north leg). LRT preemption will be provided for inbound (southbound) and outbound (northbound) trains which are in-street running as summarized below.

Inbound

Trains departing the 7th & Richards/Township 9 LRT station passes over A141TWC loop detector and sends a call to the traffic signal controller at the North 7th Street/Bannon Street intersection from the Richards Boulevard/North 7th Street controller via preempt cable. Secondary detection is provided when the train passes over A137AWD wheel detector which sends a call to the traffic signal controller at the North 7th Street/Bannon Street intersection also from the Richards Boulevard/North 7th Street controller.

The traffic signal controller will terminate conflicting vehicular phases and track signal is activated once the pedestrian phase crossing North 7th Street (north leg) ends. Only northbound thru vehicular phase (phase 8) will be permitted concurrent with track signal activation. Additionally, pedestrian phase 4 will be permitted concurrent with track signal activation.

Refer to traffic signal plans (sheet TS-4) provided in **Attachment C** for the proposed phase diagram and preemption diagram. LRT timing and operational parameters are provided in **Attachment D**.

Required Signal Timing Clearance – 32 seconds

Approach Time –31 seconds at 25 mph

Delay Timing – 0 seconds

Release – As the train enters the intersection, it passes A122AWD wheel detector and sends a release to the traffic signal controller. This will terminate the preempt phase once sufficient time has elapsed for the rear of the train to clear the intersection.

Outbound

Trains pass over A070BWD wheel detector and send a call to the traffic signal controller at the North 7th Street/Bannon Street intersection from the “house” at UPRR underpass south of North B Street via preempt cable. Secondary detection is provided when the train sends an output from A094RC which sends a call to the traffic signal controller at the North 7th Street/Bannon Street intersection from the North 7th Street/North B Street controller.

The traffic signal controller will terminate conflicting vehicular phases and track signal is activated once the pedestrian phase crossing North 7th Street (north leg) ends. Only northbound (phases 3 and 8) or southbound (phase 4) vehicular phases will be permitted concurrent with track signal activation. Additionally, pedestrian phase 4 will be permitted concurrent with track signal activation.

Refer to traffic signal plans (sheet TS-4) provided in **Attachment C** for the proposed phase diagram and preemption diagram. LRT timing and operational parameters are provided in **Attachment D**.

Required Signal Timing Clearance – 32 seconds

Approach Time – 78 seconds at 25 mph

Delay Timing – 46 seconds

Release – As the train enters the intersection, it passes A122BWD wheel detector and sends a release to the traffic signal controller. This will terminate the preempt phase once sufficient time has elapsed for the rear of the train to clear the intersection.

North 7th Street/North C Street

The new intersection at North 7th Street/North C Street is proposed to be a “T-intersection” providing secondary access to the RBOC site from North 7th Street. The proposed traffic signal will provide a protected northbound left-turn phase onto North C Street. A pedestrian phase will be provided crossing North C Street (west leg) only; no pedestrian phase is proposed crossing North 7th Street at this intersection. LRT preemption will be provided for inbound (southbound) and outbound (northbound) trains which are in-street running as summarized below.

Inbound

Trains departing the 7th & Richards/Township 9 LRT station pass over A137AWD wheel detector and send a call to the traffic signal controller at the North 7th Street/North C Street intersection from the Richards Boulevard/North 7th Street controller via preempt cable. Secondary detection

is provided when the train passes over A122AWD wheel detector which sends a call to the traffic signal controller at the North 7th Street/North C Street intersection from the North 7th Street/Bannon Street controller.

The traffic signal controller will terminate conflicting vehicular phases and track signal is activated. Only northbound thru vehicular phase (phase 8) will be permitted concurrent with track signal activation. Additionally, pedestrian phase 4 will be permitted concurrent with track signal activation.

Refer to traffic signal plans (sheet TS-5) provided in **Attachment B** for the proposed phase diagram and preemption diagram. LRT timing and operational parameters are provided in **Attachment C**.

Required Signal Timing Clearance – 32 seconds

Approach Time – 31 seconds at 25 mph

Delay Timing – 0 seconds

Release – As the train enters the intersection, it sends a release signal to the traffic signal controller. This will terminate the preempt phase once sufficient time has elapsed for the rear of the train to clear the intersection.

Outbound

Trains passes over A070BWD wheel detector and sends a call to the traffic signal controller at the North 7th Street/North C Street intersection from the “house” at UPRR underpass south of North B Street via preempt cable.

The traffic signal controller will terminate conflicting vehicular phases and track signal is activated. Only northbound (phases 3 and 8) or southbound (phase 4) vehicular phases will be permitted concurrent with track signal activation. Additionally, pedestrian phase 4 will be permitted concurrent with track signal activation.

Refer to traffic signal plans (sheet TS-5) provided in **Attachment C** for the proposed phase diagram and preemption diagram. LRT timing and operational parameters are provided in **Attachment D**.

Required Signal Timing Clearance – 32 seconds

Approach Time – 67 seconds at 25 mph

Delay Timing – 35 seconds

Release – As the train enters the intersection, it passes A122BWD wheel detector at North 7th Street/Bannon Street and sends a release to the traffic signal controller. This will terminate the preempt phase.

Attachments:

Attachment A – Project Area Map

Attachment B – Track Plans (prepared by LTK Engineering)

Attachment C – Traffic Signal Plans (prepared by KD Anderson)

Attachment D – LRT Preempt Summary Tables



Source: Google Maps, 2020

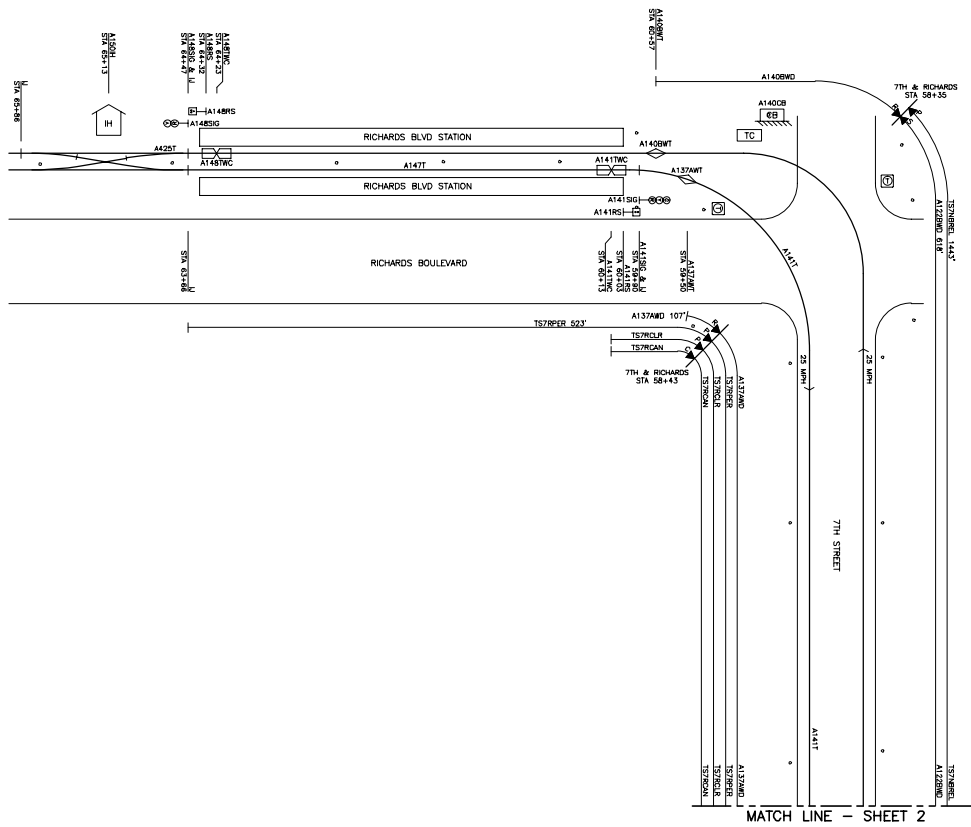
ATTACHMENT A: Project Area Map
DGS RICHARDS BOULEVARD - TRAFFIC SIGNAL PREEMPTION
City of Sacramento



Not to scale

Kimley»Horn

Attachment B – Track Plans (prepared by LTK Engineering)




REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: _____

HORIZONTAL: _____


ORIGINAL SCALE IN INCHES
FOR REDUCED PLAN




SCALE: VERTICAL: _____

HORIZONTAL: _____

ORIGINAL SCALE IN INCHES
FOR REDUCED PLAN



SCALE: VERTICAL: _____
HORIZONTAL: _____
ORIGINAL SCALE IN INCHES
FOR REDUCED PLAN

A horizontal scale bar with markings from 0 to 3 inches. The bar is divided into four equal segments, each representing 1 inch. Each inch is further divided into 16 smaller segments, representing 1/16 of an inch. The numbers 0, 1, 2, and 3 are placed below the bar at the corresponding inch marks.

PROJECT ENGINEER: _____	DATE: _____
DESIGNED BY: _____	_____
DRAWN BY: _____	_____
CHECKED BY: _____	_____



CI: 2009026
FILE:
SUBMITTAL:

RICHARDS BOULEVARD OFFICE COMPLEX
TRAFFIC PREEMPTION TECHNICAL MEMORANDUM

SHEET
1

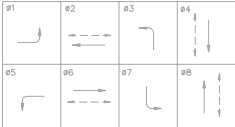
REVISIONS					SCALE: VERTICAL: _____ HORIZONTAL: _____ ORIGINAL SCALE IN INCHES FOR REDUCED PLAN 	PROJECT ENGINEER: _____ DESIGNED BY: _____ DRAWN BY: _____ CHECKED BY: _____	DATE: _____	<div><div>LTK</div><div>LTK Engineering Services</div></div>	C: 2009026	 Richards Boulevard	RICHARDS BOULEVARD OFFICE COMPLEX TRAFFIC PREEMPTION TECHNICAL MEMORANDUM	SHEET 3
MARK	DATE	DESCRIPTION	BY	CHKD					FILE: _____			

REVISIONS					SCALE: VERTICAL: _____		PROJECT ENGINEER: _____		DATE: _____		C: 2009026			RICHARDS BOULEVARD OFFICE COMPLEX		SHEET 4
MARK	DATE	DESCRIPTION		BY	CHKD	HORIZONTAL: _____		DESIGNED BY: _____		FILE: _____		TRAFFIC PREEMPTION TECHNICAL MEMORANDUM				
						ORIGINAL SCALE IN INCHES FOR REDUCED PLAN		DRAWN BY: _____		SUBMITTAL: _____						
								CHECKED BY: _____								

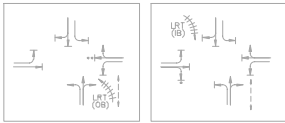
Attachment C – Traffic Signal Plans (prepared by KD Anderson)

POLE AND EQUIPMENT SCHEDULE													
LOCATION	STANDARD	#	TYPE	SEC.	MTG.	#	TYPE	SEC.	MTG.	#	TYPE	SEC.	MTG.
(A)	29-5-100 EX	2	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(B)	1-B EX	2	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(C)	1-B EX	3	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(D)	1-B EX	4	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(E)	40-5-100 EX	2	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(F)	15 EX	8	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(G)	1-B EX	2	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(H)	25-4-100 EX	6	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(I)	1-B EX	7	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(J)	25-4-100 EX	8	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(K)	1-B EX	4	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(L)	1-B EX	4	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(M)	1-B EX	5	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(N)	MODIFIED 29-5-100 NEW	4	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(P)	1-B(7) NEW	4	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T
(R)	15TS NEW	5	1WOL	12"	SV-1-T	1	WOL	12"	SV-1-T	1	WOL	12"	SV-1-T

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL NEW EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE EOL eLife Star SL30-M LED, MODEL #ESU D A01 3M 032 42 M 1020 (TYPE 3 DISTRIBUTION).

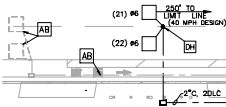


EXISTING PHASE DIAGRAM



EXISTING LRT PROPRIETARY PRE-EMPTION

- (T1) = LRT IB TRAIN SIGNAL
 (T2) = LRT OB TRAIN SIGNAL
 (IB) = LRT INBOUND TO DOWNTOWN
 (OB) = LRT OUTBOUND FROM DOWNTOWN
 * = BOTH NO RIGHT TURN AND TRAIN SYMBOL
 EMS INDICATION ON
 ** = ONLY TRAIN SYMBOL EMS INDICATION ON



CONSTRUCTION NOTES (THIS SHEET ONLY)

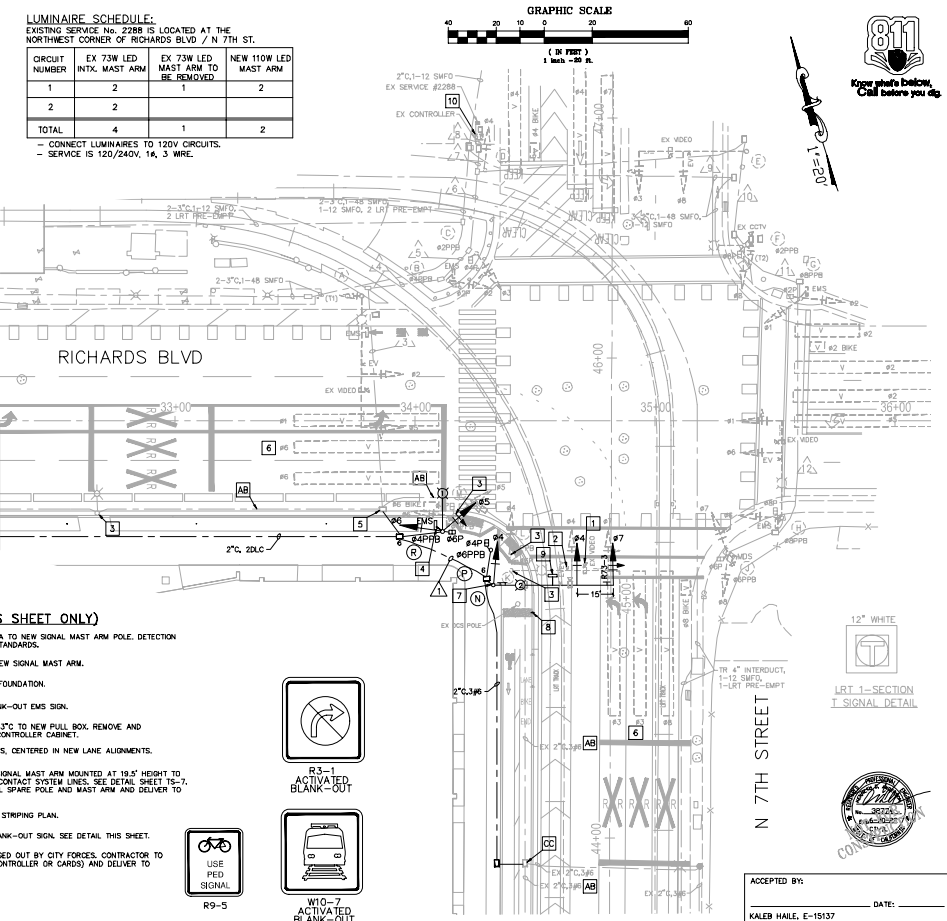
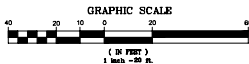
1. RELOCATE EXISTING VIDEO DETECTION CAMERA TO NEW SIGNAL MAST ARM POLE. DETECTION SYSTEM SHALL BE PROGRAMMED PER CITY STANDARDS.
2. RELOCATE EXISTING EV DETECTOR UNIT TO NEW SIGNAL MAST ARM.
3. REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
4. FURNISH AND INSTALL R3-1 ACTIVATED BLANK-OUT EMS SIGN.
5. REMOVE PULL BOX AND EXTEND EXISTING 2-3" TO NEW PULL BOX. REMOVE AND REPLACE CONDUCTORS WITH NEW BACK TO CONTROLLER CABINET.
6. REPROGRAM EXISTING VIDEO DETECTION ZONES, CENTERED IN NEW LANE ALIGNMENTS.
7. FURNISH AND INSTALL MODIFIED POLE WITH SIGNAL MAST ARM MOUNTED AT 19.5' HEIGHT TO PROVIDE CLEARANCE ABOVE OVERHEAD LRT CONTACT SYSTEM LINES. SEE DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.
8. INSTALL R9-5 SIGN. REFER TO SIGNING AND STRIPING PLAN.
9. FURNISH AND INSTALL W10-7 ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
10. EXISTING CONTROLLER CABINET TO BE CHANGED OUT BY CITY FORCES. CONTRACTOR TO FURNISH A NEW 542LX CABINET (WITHOUT CONTROLLER OR CARDS) AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.



LUMINAIRE SCHEDULE:
 EXISTING SERVICE No. 2288 IS LOCATED AT THE NORTHWEST CORNER OF RICHARDS BLVD / N 7TH ST.

CIRCUIT NUMBER	EX 73W LED	EX 73W LED	NEW 110W LED
	INTX. MAST ARM	MAST ARM TO BE REMOVED	MAST ARM
1	2	1	2
2	2		
TOTAL	4	1	2

- CONNECT LUMINAIRES TO 120V CIRCUITS.
 - SERVICE IS 120/240V, 1A, 3 WIRE.



ACCEPTED BY: _____ DATE: _____
 KALER HALE, E-15137
 SENIOR ELECTRICAL ENGINEER

REVISIONS			BENCH MARK		FIELD BOOK		SCALE		DRAWN BY: M. BECKER		DESIGN BY: M. BECKER		CHECKED BY: J. ANDERSON	
NO.	DESCRIPTION	DATE	BY	DESCRIPTION	ELEV. 7248.0 (MAY 08)		HORIZ. 1"=20'	VERT. 1"=20'	FILED	R.C.E.	DATE 6/18/21	R.C.E.	DATE	

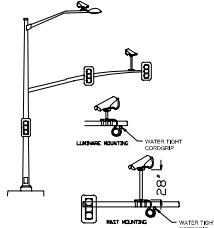
CITY OF SACRAMENTO
 DEPARTMENT OF PUBLIC WORKS

OFF-SITE IMPROVEMENT PLANS FOR
 RICHARDS BLVD OFFICE COMPLEX
 TRAFFIC SIGNAL PLAN
 RICHARDS BLVD / N 7TH STREET
 CITY OF SACRAMENTO, CA

Anderson Transportation Engineers
 3853 Taylor Road, Suite G
 Loomis, California 95650
 JUNE 18, 2021 - SECOND SUBMITTAL
 SHEET TS-1 of

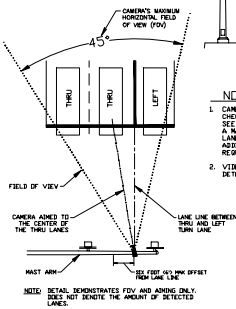
VIDEO DETECTION		
NUMBER OF APPROACH LANES	NUMBER OF CAMERAS	CAMERA MOUNTING
6 LANES + BIKE LANE OR LESS	1	MAST ARM
GREATER THAN 6 LANES + BIKE LANE	2	LUMINAIRE ARM
SPLIT PHASE	1	LUMINAIRE ARM

NOTE: A LANE IS DEFINE AS 12'

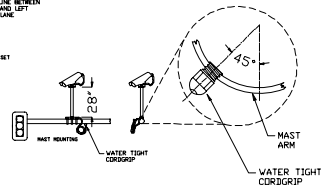


NOTES:

1. CAMERAS FIELD OF VIEW (FOV) SHALL BE CHECKED TO VERIFY THAT THE CAMERA CAN SEE ALL LANES. THE CAMERA SHALL HAVE A MAXIMUM HORIZONTAL FOV OF 45°. IF ALL LANES DO NOT FIT IN THE FOV THEN ADDITIONAL CAMERAS OR LOOPS WILL BE REQUIRED.
2. VIDEO SHALL BE USED FOR STOPBAR

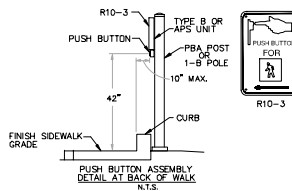


NOTE: DETAIL DOES NOT SHOW LANE



GENERAL NOTES - TRAFFIC SIGNALS

3. TRAFFIC SIGNAL SYSTEM SHALL BE CONSTRUCTED PER CITY OF SACRAMENTO IMPROVEMENT STANDARDS AND CONSTRUCTION SPECIFICATIONS AND THE CALIFORNIA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, LATEST EDITIONS.
4. THIS PLAN ACCURATE FOR ELECTRICAL AND WORK SPECIFICATIONS.
5. ALL LUMINAIRES SHALL BE LED.
6. ALL NEW TRAFFIC SIGNAL STANDARDS SHALL BE GALVANIZED.
7. ALL CONDUITS SHALL BE SCHEDULE 40 PVC UNLESS OTHERWISE SPECIFIED.
8. ALL NEW PVC CONDUIT SHALL BE 1/2" ABOVE GRADING CONDUCTOR.
9. PULL BOXES SHALL BE NO. 3 UNLESS NOTED OTHERWISE.
10. INSTALL 6" CONCRETE COLLAR AROUND ALL PULL BOXES IN NATIVE SOIL.
11. THE CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR COORDINATING CIVIL AND STREPPING WORK WITH ELECTRICAL WORK IN THESE PLANS.
12. PULL BOXES SHALL NOT BE PLACED WITHIN UNDERPASS RAMPS.
13. ALL CONDUIT PERMITTAL SHALL BE PROTECTED FROM ALL TRAFFIC.
14. CONDUCTOR INSULATION SHALL BE THW UNLESS OTHERWISE NOTED.
15. TRAFFIC CONTROL SHALL BE PER STANDARDS AND GUIDELINES PRESENTED IN THE CAL. MUTCD, SAFE VEHICULAR AND PEDESTRIAN CIRCULATION SHALL BE PER PREVIOUS ALL.



ACCEPTED BY:

KALEB HAILE, E-15137
SENIOR ELECTRICAL ENGINEER

<div style="text-align: center;">REVISIONS</div>				<div style="text-align: center;">BENCH MARK</div>		<div style="text-align: center;">ELEV. 23.048 (MAY08)</div>		<div style="text-align: center;">FIELD BOOK</div>	
NO.	DESCRIPTION	DATE	BY	DESCRIPTION					
				CITY WAL. 207'-0" C/C				SCALE	
				RAIL SET IN TRAFFIC SIGNAL BASE, SE CORNER				HORIZ. _____	
				OF RICHARDS BLVD. & SEQUOIA PACIFIC BLVD.				VERT. _____	

CITY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS

DRAWN BY: <u>M. BECKER</u>	DESIGN BY: <u>M. BECKER</u>	CHECKED BY: <u>K. ANDERSON</u>
FILE: _____	R.C.E. _____ DATE: <u>6/18/21</u>	R.C.E. _____ DATE: _____

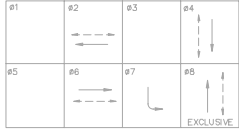
OFF-SITE IMPROVEMENT PLANS FOR
RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL PLAN
RICHARDS BLVD / N 7TH STREET
 CITY OF SACRAMENTO, CA

KD Anderson
Transportation Engineers
3853 Taylor Road, Suite G
Loomis, California 95650

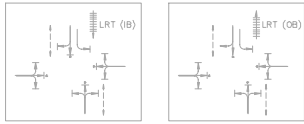
PC21-0002	15611700	2021019	SHEET TS-2 — OF —
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POLE AND EQUIPMENT SCHEDULE											
LOCATION	STANDARD	VEN. SIGNALS	PED. SIGNALS	P.P.B.	MAST ARM LENGTH	LUM. WATT.	NOTES				
		TYPE	SEC.	MTG.	TYPE	MTG.	ARROW	TRA.	SS.	ST.	LT.
(A)	19-4-100	EX	2	1W3L 12"	1-NAS	10'-11"		20'	8'	73W	LED
(B)	1-8	EX	3	1W3L 12"	TV-2-T	2	RIGHT				
(C)	24-4-100	EX	3	1W4L 12"	MAS-4B	1		35'	12'	73W	LED
(D)	1-8	EX	3	1W3L 12"	TV-2-T	2	LEFT				
(E)	1-8	EX	3	1W3L 12"	TV-2-T	2	RIGHT				
(F)	19-4-100	EX	3	1W3L 12"	MAS	10'-11"		20'	8'	73W	LED
(G)	1-8	EX	3	1W3L 12"	TV-2-T	2	LEFT				
(H)	81-5-100	EX	3	1W3L 12"	MAS-4B	1		40'	12'	73W	LED
(I)	1-8	EX	3	1W3L 12"	TV-2-T	2	RIGHT				
(J)	PBA	EX		1W3L 12"			LEFT				
(K)	PBA	EX		1W3L 12"			RIGHT				
(L)	1-8	EX	3	1W3L 12"	TV-2-T	2	RIGHT				

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL NEW EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.



EXISTING PHASE DIAGRAM



EXISTING LRT PROPRIETARY PRE-EMPTION

- (T1) = LRT IB TRAIN SIGNAL
- (T2) = LRT OB TRAIN SIGNAL
- LRT (B) = LRT INBOUND TO DOWNTOWN
- LRT (OB) = LRT OUTBOUND FROM DOWNTOWN
- * = EMS INDICATION ON

NOTE: SWITCH TO ALL RED PHASE AND ACTIVATE EMS WHEN LRT VEHICLE APPROACHES THE INTERSECTION, AS SOON AS LRT VEHICLE OCCUPIES THE INTERSECTION, SWITCH TO LRT PRE-EMPTION PHASE.

EVP ASSIGNMENTS	CABINET	CARD	PHASE
EVO	CH A	#1	
EVA	CH B	#2	
EVB	CH C	#3	
EVC	CH D	#4, #7	

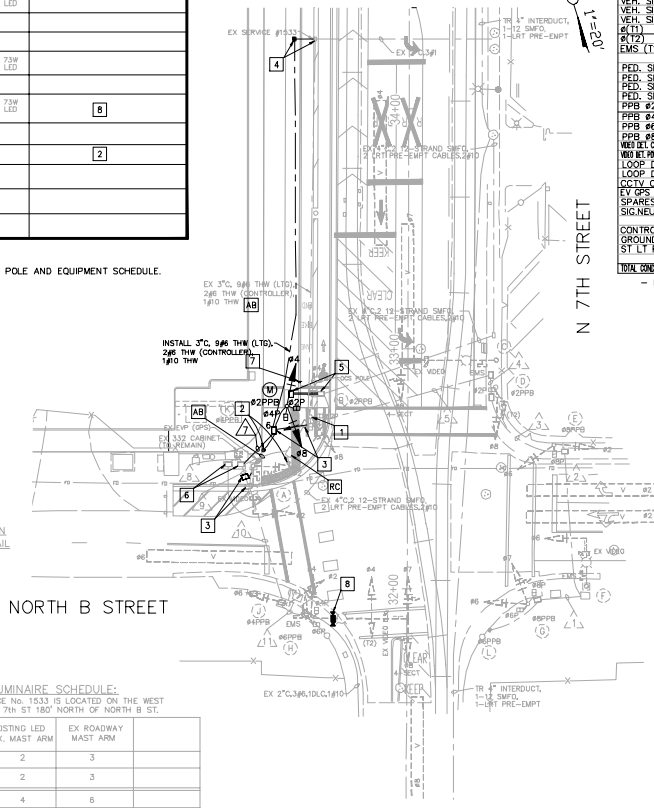
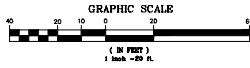


LRT 1-SECTION T SIGNAL DETAIL

EXISTING LUMINAIRE SCHEDULE:

EXISTING SERVICE NO. 1533 IS LOCATED ON THE WEST SIDE OF NORTH 7TH ST 180' NORTH OF NORTH B ST.

CIRCUIT NUMBER	EXISTING LED INTX. MAST ARM	EX ROADWAY MAST ARM
1	2	3
2	2	3
TOTAL	4	6



THIS PLAN ACCURATE FOR ELECTRICAL WORK ONLY

CONDUCTOR SCHEDULE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
CONDUIT RUN	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX	2-3" EX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
CONDUCTORS	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4	6	10	4</

- INTERSECTION SHALL BE REWIRED WITH NEW CONDUCTORS.

CONSTRUCTION NOTES (THIS SHEET ONLY)

- 1 REMOVE AND SALVAGE EQUIPMENT, REMOVE FOUNDATION.
- 2 RELOCATE PBA TO NEW FOUNDATION.
- 3 REMOVE EXISTING PULL BOX, INSTALL NEW No. 6 PULL BOX, EXTEND EXISTING CONDUITS AND CONDUCTORS TO NEW PULL BOX.
- 4 RELOCATE EXISTING SIGNAL SERVICE CABINET TO NEW FOUNDATION, EXTEND EXISTING 2\"/>



ORIGINAL SCALE IS IN INCHES
0 1 2 3



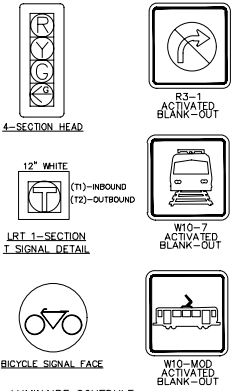
ACCEPTED BY: _____ DATE: _____
KALEB HALE, E-15137
SENIOR ELECTRICAL ENGINEER

REVISIONS			BENCH MARK		FIELD BOOK		CITY OF SACRAMENTO			RICHARDS BLVD OFFICE PLANS FOR			Anderson		SHEET	
NO.	DESCRIPTION	DATE	BY	DESCRIPTION	ELEV. 73.088 (DAVISON)	FIELD BOOK	DEPARTMENT OF PUBLIC WORKS			TRAFFIC SIGNAL PLAN			Transportation Engineers		TS-3	
				JOINT BAY 3RD-CIC						NORTH B STREET / N 7TH STREET			3853 Taylor Road, Suite G		OF	
				AND SET IN TRAFFIC SIGNAL BASE, SE CORNER									Loomis, California 95650			
				OF RICHARDS BLVD. & SERRA PACIFIC BLVD.									JUNE 18, 2021 - SECOND SUBMITTAL			
							DRAWN BY: M. BECKER			DESIGN BY: M. BECKER			CHECKED BY: J. ANDERSON			
							FILED			R.C.E. DATE 5/18/21			R.C.E. DATE			

POLE AND EQUIPMENT SCHEDULE																	
LOCATION	STANDARD	VEH. SIGNALS			PED. SIGNALS			P.P.B.	MAST ARM LENGTH	LUM. WATT.	NOTES						
		#	TYPE	SEC	#	TYPE	MTG.					#	ARROW	TRA SIG.	ST. L.		
(A)	28-4-100	4	1WOL	12"	SV-1-T	4	1WOL	SP-1-T	2	LEFT	(FUTURE)	12'	110W LED	CAP SMA MOUNTING PLATE.	[12]	[18]	
(B)	1-8	3	1WOL	12"	SV-3-T	2	1WOL	SP-1-T	2	LEFT				INSTALL T SIGNAL ON POLE.	[12]		
(C)	(MODIFIED) 28-4-100	3	1WOL	12"	MAT SV-2-T	2	1WOL	SP-1-T	2	LEFT		40'	12'	110W LED	INSTALL O3 SIGN "Bannon St." AND R73-3(CA) SIGN. INSTALL T SIGNAL ON POLE.	[3]	[13] [15]
(D)	1-8C	3	1WOL	12"	SV-2-T	2	1WOL	TP-1-T	2	LEFT							
(E)	23-4-100	6	1WOL	12"	MAS-4B SV-2-T	4	1WOL	SP-1-T	2	LEFT		35'			INSTALL O3 SIGN "N 7th St" AND R61-19 SIGN. INSTALL T SIGNAL ON POLE.	[14]	[16] [17]
(F)	(MODIFIED) 28-5-100	4	1WOL	12"	MAT SV-2-TB	4	1WOL	SP-1-T	2	LEFT		50'	15'	110W LED	INSTALL O3 SIGN "Bannon St" AND R3-18(CA) SIGN. INSTALL R9-3 SIGN ON POLE. INSTALL T SIGNAL ON POLE.	[3]	[6] [10] [12] [13] [14] [15]
(G)	1-8	6	1WOL	12"	TV-1-T					4 RIGHT						[14]	

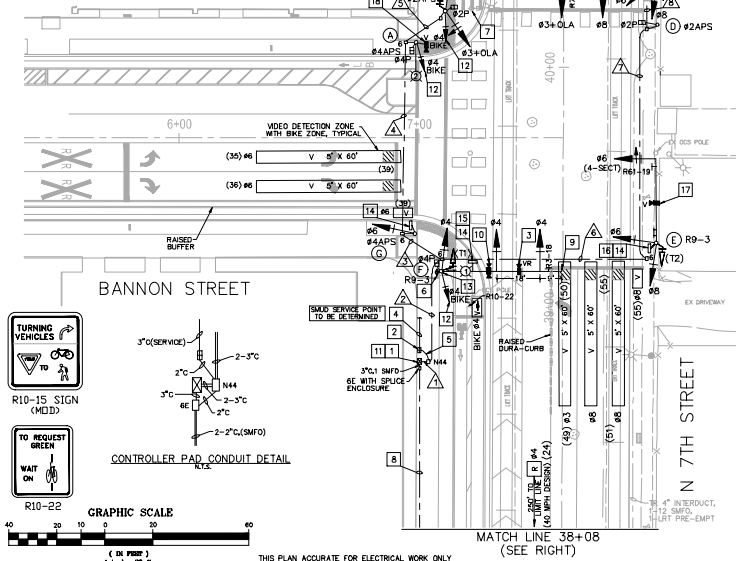
- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE EOL eLife Star SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 1020 (TYPE 3 DISTRIBUTION).

REFER TO SHEET TS-11 FOR CONDUCTOR SCHEDULE



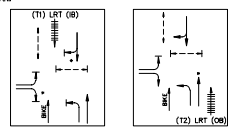
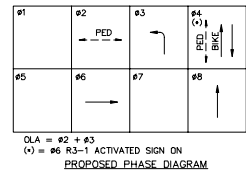
LUMINAIRE SCHEDULE		IS LOCATED AT THE SOUTHWEST CORNER OF N 7TH ST / BANNON ST.	
CIRCUIT NUMBER	NEW METERED SERVICE	NEW 110W LED MAST ARM	
1	2		
2	1		
TOTAL	3		

- CONNECT LUMINAIRES TO 120V CIRCUITS.
- NEW SERVICE IS 120/240V, 1Ø, 3 WIRE.
- SMUD S/A #

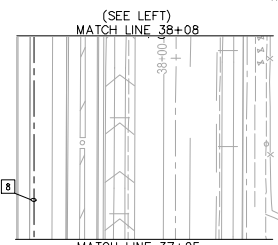


CONSTRUCTION NOTES (THIS SHEET ONLY)

- FURNISH AND INSTALL, TYPE 34X4 CABINET AND FOUNDATION, ATC/EX TS2 TYPE 2 2070 CONTROLLER, DA SOFTWARE, CSDO E-2000-ETC-6-B, TRIPPLITE USBAR 6 SURGE PROTECTOR AND ALL ASSOCIATED EQUIPMENT. DOOR SHALL OPEN TO THE EAST. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.
- FURNISH AND INSTALL A METERED SERVICE PEDESTAL FOR TRAFFIC SIGNAL PER CITY STANDARDS AND CITY STANDARD DRAWING. FRONT DOOR SHALL OPEN TO THE SIDEWALK.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA ON SIGNAL MAST ARM, VECTOR VIDEO/RADAR HYBRID UNIT AS MANUFACTURED BY ITERRIS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.
- INSTALL 3"Ø, 3/4" 1/8" DRD FROM SERVICE CABINET TO SERVICE POINT. CONTACT SMUD FOR SERVICE HOOK-UP. CONTRACTOR SHALL INCLUDE AS PART OF HIS WORK ALL COSTS ASSOCIATED WITH SERVICE INSTALLATION.
- INSTALL 2"Ø, 3/8" THW (CONTROLLER), 3/8" THW (LIGHTING), 1/4" THW, 3/4" THW (PHOTO CELLS).
- FURNISH AND INSTALL GPS PRIORITY CONTROL UNIT ON POLE. REFER TO DETAIL SHEET TS-8. GPS SHALL BE PROGRAMMED PER CITY STANDARDS.
- REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- INSTALL 2-2"Ø, 1-12 STRAND SAFD, 2 LRT PRE-EMPT COMMUNICATION CABLES.
- PROVIDE AND CAP TENSION FOR FUTURE USE.
- FURNISH AND INSTALL, PTZ CCTV CAMERA (AXIS Q155-E) WITH MAST ARM PARAPET MOUNT. INSTALL BELDON CAT6 CABLE 1927A TO CONTROLLER CABINET.
- TERMINATE FIBER CABLE IN CONTROLLER CABINET.
- FURNISH AND INSTALL SIGNAL HEAD WITH BICYCLE INDICATIONS PER STATE STANDARD PLAN ES-4C.
- FURNISH AND INSTALL MODIFIED POLE WITH SIGNAL MAST ARM MOUNTED HIGHER ON POLE TO PROVIDE CLEARANCE ABOVE OVERHEAD LRT CONTACT SYSTEM LINES. SEE DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.
- FURNISH AND INSTALL R3-1 ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL W10-7 MOD ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL W10-MOD ACTIVATED BLANK-OUT SIGN. SEE DETAIL SHEET.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA ON SIGNAL MAST ARM, VANTAGE R24 COLOR CAMERA WITH EDGE2 PROCESSOR AND SMARTCYCLE TECHNOLOGY AS MANUFACTURED BY ITERRIS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.



PROPOSED LRT PROPRIETARY PRE-EMPTION
(T1) = LRT 1B TRAIN SIGNAL
(T2) = LRT 0B TRAIN SIGNAL
LRT (B) = LRT INBOUND TO DOWNTOWN
LRT (B) = LRT OUTBOUND FROM DOWNTOWN
* = ACTIVATED SIGNS ON



EVP ASSIGNMENTS			
CABINET	CARD	PHASE	
EVS	CH A	Ø6	
EVS	CH B	Ø5	
EVS	CH C	Ø4	



ACCEPTED BY: _____ DATE: _____
KALER HALE, E-15137
SENIOR ELECTRICAL ENGINEER

REVISIONS			BENCH MARK		FIELD BOOK		SCALE		DRAWN BY: M. BUCKNER		DESIGN BY: M. BUCKNER		CHECKED BY: J. ANDERSON		DATE: 6/18/21		R.G.E. DATE: _____	
NO.	DESCRIPTION	DATE	BY	DESCRIPTION	ELEV. 2408.0 (ANDB)	FIELD BOOK	SCALE	HORIZ. 1"=20'	VERT. 1"=20'	FILE	R.G.E.	DATE	FILE	R.G.E.	DATE	FILE	R.G.E.	DATE

CITY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS

OFF-SITE IMPROVEMENT PLANS FOR
RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL PLAN
N 7th STREET / BANNON STREET
CITY OF SACRAMENTO, CA

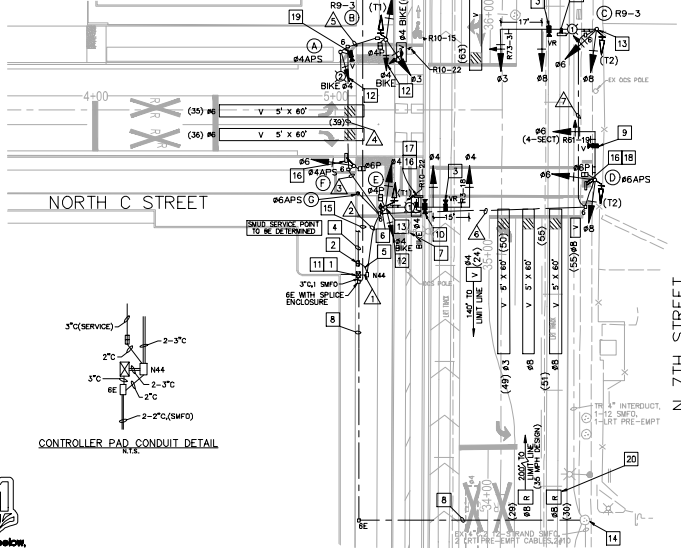
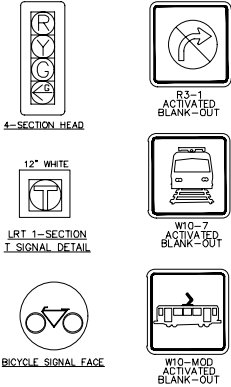
Anderson
Transportation Engineers
3853 Taylor Road, Suite G
Loomis, California 95650
JUNE 18, 2021 - SECOND SUBMITTAL

PROJECT: 0002
FILE: 15617200
PL: 20201019

SHEET
TS-4
OF

POLE AND EQUIPMENT SCHEDULE									
LOCATION	STANDARD	#	TYPE	WTS.	TYPE	WTS.	TYPE	WTS.	NOTES
(A)	15TS	4	1WXL	12"	SV-1-T	4	1WXL	SP-1-T	12' 110W LED
(B)	1-B	3	1WXL	12"	SV-1-T	4	1WXL	SP-1-T	12' 110W LED
(C)	(MODIFIED) 28-4-100	8	1WXL	12"	SV-2-T	6	1WXL	SP-1-T	12' 110W LED
(D)	16-3-100	6	1WXL	12"	SV-2-T	6	1WXL	SP-1-T	12' 110W LED
(E)	(MODIFIED) 24-4-100	4	1WXL	12"	SV-2-T	6	1WXL	SP-1-T	12' 110W LED
(F)	1-B	6	1WXL	12"	SV-1-T	4	1WXL	SP-1-T	12' 110W LED
(G)	PBA	1	1WXL	12"	SV-1-T	4	1WXL	SP-1-T	12' 110W LED

- ALL PEDESTRIAN INDICATIONS SHALL BE THE "COUNTDOWN" TYPE.
- A = 12" ARROW INDICATIONS.
- CONTRACTOR TO PROVIDE AND INSTALL ALL EQUIPMENT SHOWN IN THE POLE AND EQUIPMENT SCHEDULE.
- PBA = PUSH BUTTON ASSEMBLY.
- LED LIGHTING SHALL BE EOL Elite Star SL3C-M LED, MODEL #ESU D A01 3M 032 42 M 1020 (TYPE 3 DISTRIBUTION).



CONTROLLER PAD CONDUIT DETAIL

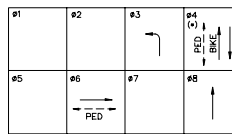
REFER TO SHEET TS-11 FOR CONDUCTOR SCHEDULE

(SEE SHEET TS-4)
MATCH LINE 37+25

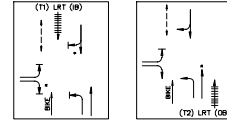
CONSTRUCTION NOTES (THIS SHEET ONLY)

- FURNISH AND INSTALL TYPE 542X CABINET AND FOUNDATION, AT/EX TS-2 TYPE 2010 CONTROLLER, 24 SOFTWARE, USED E-2000-RTG-6-1L, TRIP/ITE SIGNAL E-2000-RTG-6-1L, AND ASSOCIATED EQUIPMENT. DOOR SHALL OPEN TO THE EAST. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.
- FURNISH AND INSTALL A METEDED SERVICE PEDESTAL FOR TRAFFIC SIGNAL PER CITY STANDARDS AND CITY STANDARD DRAWING. FRONT DOOR SHALL OPEN TO THE SIDEWALK.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA ON SIGNAL MAST ARM. VANTAGE R24 COLOR CAMERA WITH EDGE2 PROCESSOR AND SMARTCYCLE TECHNOLOGY AS MANUFACTURED BY ITEMS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.
- INSTALL 3"Ø 3M, 146 GRD FROM SERVICE CABINET TO SERVICE POINT. CONTACT SMUD FOR SERVICE HOOD-UP. CONTRACTOR SHALL INCLUDE AS PART OF HIS WORK ALL COSTS ASSOCIATED WITH SERVICE INSTALLATION.
- INSTALL 2"Ø 288 THW (CONDUCTORS), 3/8" THW (LIGHTING), 1/8" THW, 3/16" THW (PHOTO CELL).
- FURNISH AND INSTALL GPS PRIORITY CONTROL UNIT ON POLE. REFER TO DETAIL SHEET TS-8. GPS SHALL BE PROGRAMMED PER CITY STANDARDS.
- REMOVE AND SALVAGE EQUIPMENT. REMOVE FOUNDATION.
- INSTALL 2-2"Ø, 2-12 STRAND SMFO, 4 LRT PRE-EMPT COMMUNICATION CABLES.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA ON SIGNAL MAST ARM. VANTAGE R24 COLOR CAMERA WITH EDGE2 PROCESSOR AND SMARTCYCLE TECHNOLOGY AS MANUFACTURED BY ITEMS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.
- FURNISH AND INSTALL PTZ CCTV CAMERA (AXIS 06150-E) WITH MAST ARM PARAPET MOUNT. INSTALL BELCON CAT5 CABLE 7507A TO CONTROLLER CABINET.
- TERMINATE FIBER CABLE IN CONTROLLER CABINET.
- FURNISH AND INSTALL SIGNAL HEAD WITH BICYCLE INDICATIONS PER STATE STANDARD PLAN ES-4C.
- FURNISH AND INSTALL MODIFIED POLE WITH SIGNAL MAST ARM MOUNTED HIGHER ON POLE TO PROVIDE CLEARANCE ABOVE OVERHEAD LRT CONTACT SYSTEM LINES. SEE DETAIL SHEET TS-7. CONTRACTOR SHALL PROVIDE ONE ADDITIONAL SPARE POLE AND MAST ARM AND DELIVER TO CITY ELECTRICAL MAINTENANCE YARD.
- INSTALL CONDUIT, FIBER CABLES AND LRT PRE-EMPT CABLES TO COMMUNICATION VAULT. COORDINATE WITH CITY TRAFFIC OPERATIONS FOR CABLE, SPLICING AND INSTALLATION REQUIREMENTS.
- INSTALL 2-2"Ø, 1-12 STRAND SMFO, 2 LRT PRE-EMPT COMMUNICATION CABLES.
- FURNISH AND INSTALL R3-1 ACTIVATED BLANK-OUT SIGN. SEE DETAIL THIS SHEET.
- FURNISH AND INSTALL W10-7 ACTIVATED BLANK-OUT SIGN. SEE DETAIL THIS SHEET.
- FURNISH AND INSTALL W10-MOD ACTIVATED BLANK-OUT SIGN. SEE DETAIL THIS SHEET.
- FURNISH AND INSTALL VIDEO DETECTION CAMERA (POLE MOUNTED) FOR BIKE DETECTION. VANTAGE R24 COLOR CAMERA WITH EDGE2 PROCESSOR AND SMARTCYCLE TECHNOLOGY AS MANUFACTURED BY ITEMS OR APPROVED EQUAL. INSTALLATION SHALL INCLUDE ALL MOUNTING HARDWARE, CABLES AND ASSOCIATED EQUIPMENT. PROGRAMMING SHALL BE BY FACTORY AUTHORIZED TECHNICIAN.
- PROGRAM DETECTION FOR 35 MPH AT 200'. 40 MPH DESIGN RESULTS IN DETECTION ZONES LOCATED WITHIN THE NORTH B STREET INTERSECTION.
- ABANDON EXISTING DETECTOR LOOP, HANDHOLE AND CONDUIT. REMOVE CURB SIDE PULL BOX.

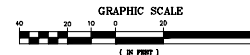
EVP ASSIGNMENTS	CABINET	CARD	PHASE
EV3	CH A	06	
EV4	CH B	43+06	
EV5	CH C	04	



(*) = 06 R3-1 ACTIVATED SIGN ON
PROPOSED PHASE DIAGRAM



PROPOSED LRT PROPRIETARY PRE-EMPTION
(11) = LRT IB TRAIN SIGNAL
(12) = LRT OB TRAIN SIGNAL
LRT (IB) = LRT INBOUND TO DOWNTOWN
LRT (OB) = LRT OUTBOUND FROM DOWNTOWN
* = ACTIVATED SIGNS ON



ACCEPTED BY: _____ DATE: _____
KALER HALE, E-15137
SENIOR ELECTRICAL ENGINEER

NO.	REVISIONS	DATE	BY	BENCH MARK	FIELD BOOK
1	DESCRIPTION			DESCRIPTION	ELEV. 2328.0 (ASPH)
2				DESCRIPTION	ASPH SET IN TRAFFIC SIGNAL BASE, SE CORNER
3				DESCRIPTION	OF RICHARDS BLVD. & SEDONA PARKED BLVD.

CITY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS			
SCALE	DRAWN BY: M. BECKER	DESIGN BY: M. BECKER	CHECKED BY: J. ANDERSON
HORIZ. 1"=20'	FILED	R.C.E. BY: _____	DATE: 6/18/21
VERT. 1"=20'			

OFF-SITE IMPROVEMENT PLANS FOR
RICHARDS BLVD OFFICE COMPLEX
TRAFFIC SIGNAL PLAN
N 7th STREET / NORTH C STREET
CITY OF SACRAMENTO, CA

Anderson Transportation Engineers 3853 Taylor Road, Suite G Loomis, California 95650	CR-22-0002 P/16/17/20 P/20/21/19	SHEET TS-5 OF
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Attachment D – LRT Preempt Summary Tables

Richards Blvd OC LRT Preempt

INTERSECTION LOCATION	TRAIN DETECTOR FUNCTION	RT SIGNAL DETECTOR NAME	RT SIGNAL DETECTOR LOCATION	Timing			CONNECTIONS BETWEEN RT'S CB AND CITY CONTROLLERS	7th&Bannon T-Signal Activation and Release	Traffic Signals 7th&Bannon Activation and Aspect	Pedestrian Crossing Signals 7th&Bannon Activation and Aspect	COMMENTS
				REQUIRED SIGNAL TIMING (SEC) *	APPROACH TIME (SEC)	DELAY TIMING (SEC)					
N 7th & Bannon St (INBOUND)	Primary	A141TWC Loop or TS7RPER	Richards Blvd Station	32 sec (7 sec Walk + 20 sec FDW + 4 sec Yellow + 1 sec All-Red)	31	0	City wiring between the existing 7th & Richards City Controller and the RT CB	T-SIGNAL SHOULD BE ACTIVATED ONCE CROSS STREET (XING 7TH ST) PEDESTRIAN PHASE ENDS.	TERMINATE CONFLICTING VEHICLE PHASES AFTER DELAY. IF CONFLICTING PED PHASE IS SERVED, CONTINUE SERVING UNTIL IT IS COMPLETED. T-SIGNAL WILL BE ACTIVATED. ONLY NB THRU PHASE WILL BE GREEN CONCURRENT WITH T-SIGNAL.	PEDESTRIAN SIGNAL CROSSING THE WEST LEG WILL HAVE "WALK" SIGNAL	
	Secondary	A137AWD Wheel Detector	7th & Richards		20	0	City wiring between the existing 7th & Richards City Controller and the RT CB				
	Release	A122AWD Wheel Detector	7th & Bannon		N/A	N/A	City wiring between the new 7th & Bannon City Controller and the RT CB				
N 7th & Bannon St (OUTBOUND)	Primary	A070BWD Wheel Detector	UPRR UNDERPASS	32 sec (7 sec Walk + 20 sec FDW + 4 sec Yellow + 1 sec All-Red)	78	46 sec	City wiring between the existing 7th & B City Controller and the RT CB	T-SIGNAL SHOULD BE ACTIVATED ONCE CROSS STREET (XING 7TH ST) PEDESTRIAN PHASE ENDS.	TERMINATE CONFLICTING VEHICLE PHASES AFTER DELAY. IF CONFLICTING PED PHASE IS SERVED, CONTINUE SERVING UNTIL IT IS COMPLETED. T-SIGNAL WILL BE ACTIVATED. NB/SB THRU PHASES WILL BE GREEN CONCURRENT WITH T-SIGNAL.	PEDESTRIAN SIGNAL CROSSING THE WEST LEG WILL HAVE "WALK" SIGNAL	
	Secondary	TS7NBREL	7th & N B		23	0	City wiring between the existing 7th & B City Controller and the RT CB				
	Release	A122BWD Wheel Detector	7th & Bannon		N/A	N/A	City wiring between the new 7th & Bannon City Controller and the RT CB				

* Walk+FDW+Yellow+All Red time

TS7RPER: Existing RT output from A150H delivered to 7th & Richards TC. (Track circuit A147T is occupied and no A141SIG route has been called and the previous A141SIG route had not been cancelled.)
TS7RCAN: Existing RT output from A150H delivered to 7th & Richards TC. (Track circuit A147T is occupied and A141SIG has been cleared and then cancelled.)
TS7RCLR: Existing RT output from A150H delivered to 7th & Richards TC. (Track circuit A147T is occupied and an A141SIG route has been cleared and the previous A141SIG route had been cancelled.)
A137AWD: Existing RT output from A140CB delivered to 7th & Richards TC.
A122AWD: Existing RT output from A122CB delivered to 7th & Richards TC.
A070BWD: Existing RT output from A070CB delivered to 7th & North B TC.
TS7NBREL: Existing RT output from A094RC delivered to 7th & North B TC. (Track circuit A405T is occupied. Expires after 10 seconds.)
A122BWD: Existing RT output from A122CB delivered to 7th & Richards TC.

Richards Blvd OC LRT Preempt

INTERSECTION LOCATION	TRAIN DETECTOR FUNCTION	RT SIGNAL DETECTOR NAME	RT SIGNAL DETECTOR LOCATION	Timing			CONNECTIONS BETWEEN RT'S CB AND CITY CONTROLLERS	7th&C T-Signal Activation and Release	Traffic Signals 7th&C. Activation and Aspect	Pedestrian Crossing Signals 7th&C. Activation and Aspect	COMMENTS
				REQUIRED SIGNAL TIMING (SEC) *	APPROACH TIME (SEC)	DELAY TIMING (SEC)					
N 7th & C (INBOUND)	Primary	A137AWD Wheel Detector	7th & Richards	32 sec (assumed min split)	31	0	City wiring between the existing 7th & Richards City Controller and the RT CB	T-SIGNAL MAY BE ACTIVATED ANYTIME (NO CONFLICTING PED PHASE)	TERMINATE CONFLICTING VEHICLE PHASES AFTER DELAY. T-SIGNAL WILL BE ACTIVATED. ONLY NB THRU PHASE WILL BE GREEN CONCURRENT WITH T-SIGNAL.	PEDESTRIAN SIGNAL CROSSING THE WEST LEG WILL HAVE "WALK" SIGNAL	
	Secondary	A122AWD Wheel Detector	7th & Bannon		11	0	City wiring between the new 7th & Bannon City Controller and the RT CB				
	Release	TS7NBREL / TS7NBCAN	7th & N B		N/A	N/A	City wiring between the existing 7th & B City Controller and the RT CB	T-SIGNAL IS RELEASED AND NORMAL TRAFFIC CONTROL RESUMES	EB PHASE WILL BECOME "GREEN" AS TRAIN CLEARS.	N/A	
N 7th & C (OUTBOUND)	Primary	A070BWD Wheel Detector	UPRR UNDERPASS	32 sec (assumed min split)	67	35 sec	City wiring between the existing 7th & B City Controller and the RT CB	T-SIGNAL MAY BE ACTIVATED ANYTIME (NO CONFLICTING PED PHASE)	TERMINATE CONFLICTING VEHICLE PHASES AFTER DELAY. T-SIGNAL WILL BE ACTIVATED. NB/SB THRU PHASES WILL BE GREEN CONCURRENT WITH T-SIGNAL.	PEDESTRIAN SIGNAL CROSSING THE WEST LEG WILL HAVE "WALK" SIGNAL	
	Secondary										
	Release	A122BWD Wheel Detector	7th & Bannon		N/A	N/A	City wiring between the new 7th & Bannon City Controller and the RT CB	T-SIGNAL IS RELEASED AND NORMAL TRAFFIC CONTROL RESUMES	EB PHASE WILL BECOME "GREEN" AS TRAIN CLEARS.	N/A	

* Walk+FDW+Yellow+All Red time

A137AWD: Existing RT output from A140CB delivered to 7th & Richards TC.
TS7NBREL: Existing RT output from A094RC delivered to 7th & North B TC. (Track circuit A405T is occupied. Expires after 10 seconds.)
TS7NBCAN: Existing RT output from A094RC delivered to 7th & North B TC. (Either A111SIG or A113SIG is cancelled after a route had been requested.)
A070BWD: Existing RT output from A070CB delivered to 7th & North B TC.
A122BWD: Existing RT output from A122CB delivered to 7th & Richards TC.